

A STUDY OF AFRICAN CHIRONOMIDAE
PART II



BY
PAUL FREEMAN *xyf.*

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A STUDY OF THE CHIRONOMIDAE (DIPTERA) OF AFRICA SOUTH OF THE SAHARA

PART II

By PAUL FREEMAN

CONTENTS

	PAGE
INTRODUCTION	287
ADDITIONS TO PART I	288
SUBFAMILY ORTHOCLADIINAE	291
Key to genera	292
Genus <i>Metriocnemus</i>	294
Genus <i>Cricotopus</i>	303
Genus <i>Trichocladius</i>	313
Genus <i>Harrisonina</i>	318
Genus <i>Cardiocladius</i>	321
Genus <i>Psectrocladius</i>	324
Genus <i>Chaetocladius</i>	325
Genus <i>Orthocladius</i>	330
Genus <i>Nanocladius</i>	338
Genus <i>Limnophyes</i>	344
Genus <i>Smittia</i>	346
Genus <i>Knepperia</i>	359
SUBFAMILY CORYNONEURINAE	360
Genus <i>Corynoneura</i>	361
Genus <i>Thienemanniella</i>	364

SYNOPSIS

Part I of this Study was published in No. 1 of Vol. 4 of the *Bulletin of the British Museum (Natural History)*, pp. 1-67. Part II continues the description of the Chironomid fauna of Africa south of the Sahara and deals with the subfamilies Orthoclatiinae and Corynoneurinae as well as giving additional information on a few of the species described in Part I and describing two new species of Tanypodinae.

Although the classification employed follows the broad outlines laid down by F. W. Edwards, his large genera have been split up more or less as was done by Goetghebuer. Eleven Orthoclatiine genera are recognized for the African fauna, one being new; *Knepperia* Kieffer makes a twelfth, but is unrecognizable. There are species of two genera of Corynoneurinae. Many species very closely resemble Palaearctic species and the same species groups are often to be found in the two Regions. Keys are given to genera and species, nearly 90 species are described, 27 being new, and in addition notes are added on species described by Kieffer but which cannot be recognized.

INTRODUCTION

PART I of this Study was published as No. 1 of Vol. 4, of the *Bulletin of the British Museum (Natural History)* (1955). In Part I, in addition to descriptions of species,

details are given of the scope of the Studies, an Historical Survey of previous work on the Group and Methods of Collection, Examination, etc.; there is also an account of the Structure of adult Chironomids, some notes on Distribution and keys to the Subfamilies. Part II covers the subfamilies Orthocladiinae and Corynoneurinae, leaving the large subfamily Chironominae to be dealt with in later Parts.

Since the publication of Part I, I have received further large consignments of Chironomids from Sudan (Mr. E. T. M. Reid), Transvaal (Mr. A. D. Harrison) and Belgian Congo (collected by Dr. J. Verbeke on the Belgian Hydrobiological Expedition to the East African Lakes, Tanganyika, Kivu, Edward and Albert). There is also a small collection from Ethiopia (Dr. Max Ovazza). I should like to take this opportunity of thanking these gentlemen for making their collections available to me for study.

I have also visited the Musée Royal du Congo Belge, Tervuren, to study the types of Goetghebuer's species which were kindly placed at my disposal by Dr. P. L. G. Benoit of that Institute.

The additional material available has enabled me to describe the males and add more distributional data to two of the rarer species described in Part I and to describe two new species of Tanypodinae. The interpretations I made of Goetghebuer's species in Part I were correct with the exception of *Pentaneura interrupta* and *palpalis*. These I am correcting and I am adding notes on the type of *P. annulator*.

ADDITIONS TO PART I

Pentaneura (Pentaneura) annulator Goetghebuer

I have now seen the holotype female of this species and can state that it definitely belongs to the subgenus *Pentaneura* because the dorso-central bristles run straight across the prescutellar area which is scarcely indicated. The wing pattern is not nebulous as stated by Goetghebuer, but is quite definite.

Female. Wing length 1.4 mm.

Head dark brown, antennae with 12 segments. *Thorax* grey from pruinosity, all hairs long and yellow. *Legs* yellowish brown, knees plain, unmarked, apices of all tibiae dark brown, all tarsi broken, but annulated according to Goetghebuer. *Wings*

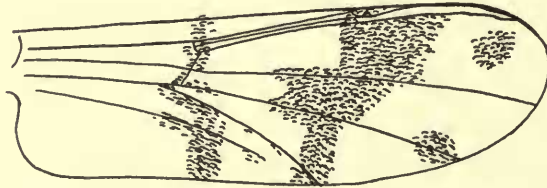


FIG. 1. Wing of holotype female of *Pentaneura annulator*.

distinctively patterned with dark macrotrichia as shown in fig. 1 (drawn free-hand from the holotype); halteres yellow. *Abdomen* black, hairs mostly pale and adpressed, cerci yellow.

Holotype female, BELGIAN CONGO : Kabasha, Chambi.

***Pentaneura (Pentaneura) interrupta* Goetghebuer**

Ablabesmyia interrupta Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* **27**, 361.

Ablabesmyia palpalis Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* **27**, 362 (SYN. NOV.) *nec palpalis* Freeman, 1955, *Bull. Brit. Mus. (N.H.)* **4**, 32.

Pentaneura (Pentaneura) interrupta Freeman, 1955, *Bull. Brit. Mus. (N.H.)* **4**, 33.

I have now seen the holotype male of *interrupta* and the holotype female of *palpalis* in the Musée Royal du Congo Belge. Both were collected at the same time in the same locality and I am in no doubt that they are the two sexes of the same species. The female from Natal referred by me to *palpalis* in 1955 is different and may be the female of *longipes*, at any rate it is insufficiently distinct for a new species to be described based on the female alone.

The distinguishing feature of *interrupta* lies in the wing markings. The basal half of the wings and the apex are covered with dark macrotrichia so as to appear grey, the intermediate area bears pale macrotrichia (couplet 11 of my key needs modifying). Goetghebuer was wrong in stating that there is a transverse grey band; he also overlooked the pale subapical area in *palpalis*. The male abdomen is less distinctively marked than stated by Goetghebuer, all basal segments carry a central brown band, but it is rather more distinct on segment 3. Couplet 16 should be amended to run out to “? *longipes* ♀.”

ADDITIONAL LOCALITY. TRANSVAAL: 1 ♂, 1 ♀, Sabie, ix. 1954 (*A. D. Harrison*).

***Pentaneura (Pentaneura) ovazzai* sp. n.**

A fairly large species with definite black and white abdominal markings; knees faintly brown, hypopygium simple and not of the *cygnus* type; wings plain, separating it from the others with darkened knees (see my key, 1955, p. 22, couplet 5). Probably most nearly allied to *edwardsi* Freeman, from which it can be distinguished by the faint brown knees and strongly marked abdomen.

Male. Wing length 3.0 mm.

Head and mouthparts yellowish, vertex more brown, antennae brown, A.R. 1.2. *Thorax* with yellowish background; stripes, sternopleuron and postnotum brown, pleura brown around wing bases, ventral darkening thus joined to lateral mesonotal stripes; shoulders and prescutellar area pruinose; bristles yellow. *Legs* pale yellow, knees and apices of tibiae with vague brown tinges; anterior tibiae slightly longer than femora, middle ones equal, posterior tibiae about one and a half times as long as femora; L.R. 0.8. *Wings* plain and with venation and shape quite similar to *edwardsi* (Pt. I, Text-fig. 7, a), clothed uniformly with dark macrotrichia and with no markings due either to staining or to areas of dark macrotrichia. Halteres whitish. *Abdomen* white with brownish black basal bands on some of the segments: segment 1 white, 2 white with vague indications of lateral basal darkenings, 3 and 4 white with basal halves dark, 5 white with basal darkening reduced to lateral dark areas, 6 and 7 with basal two-thirds brownish black, 8 totally white, hypopygium brown. Styles straight, coxites in dry specimen apparently lacking basal appendages.

Holotype male, ETHIOPIA: Addis-Alem, 26. vi. 53 (*M. Ovazza*) in British Museum.

Tanypus fuscus Freeman

Further material enables me to confirm that it is a distinct species and not a variety of *brevipalpis*. Both sexes are now available and the male resembles the female in colour, pattern and in the unusually large size of the mesonotal tubercle.

ADDITIONAL LOCALITIES. SUDAN: 1 ♀, Wunatong nr. Wau, iii.1955 (*E. T. M. Reid*). UGANDA: 1 ♂, Jinja (*P. S. Corbet*). BELGIAN CONGO: 1 ♂, 2 ♀, Vitshumbi (Lake Edward), i.1953 and 1 ♂, Kasenyi, ii.1953 (*J. Verbeke*).

Clinotanypus verbekei sp. n.

In size and appearance not unlike *claripennis*, but thorax quite different in pattern and colour. Thorax mainly black, stripes separate, anterior tarsi bearded, abdomen of male yellow, banded with black, of female entirely black. In my key in part I (p. 52) an extra couplet is necessary to include this species and *claripennis* which can then be separated by the thoracic pattern; couplet 3 will require the removal of "female thorax without black markings" and the replacement of "*claripennis* Kieffer" by the figure 4.

Male. Wing length 3.0 mm.

Head dark brown, antennae and plumes very dark or blackish, A.R. about 3.5. *Thorax* very dark, blackish with some pruinosity; stripes separated by narrow yellow pruinose lines, dorso-central yellow line with a lateral branch in the humeral region outlining the shoulders which are black; prescutellar area slightly paler brown, prothorax pale; all bristles and hairs short, inconspicuous and yellow; mesonotal tubercle absent. *Legs* with coxae, apices of tibiae, tarsal segments 4-5 of all legs and 2-5 of front legs black, remainder of legs yellow; femora variably infuscated; anterior tarsi with long but not dense beard on segments 2-3; L.R. 0.8. *Wings* clear, crossvein r-m clouded, venation as in *claripennis*; halteres black. *Abdomen* yellow, segments 3-8 with dark markings, hypopygium black; segments 3-4 with a dark band in apical half, 5 with dark marks more or less reduced to lateral spots, 6-8 with black bands occupying apical halves; segment 2 sometimes with trace of dark band similar to 3.

Female. Antennae with 14 segments; thorax and legs as in male, except for absence of beard, wings rather darker anteriorly as in *claripennis*, abdomen totally black, without any trace of yellow pattern.

Holotype male and 5 ♂, 3 ♀, paratypes, BELGIAN CONGO: Albertville (Lac Tanganyika) 8-18.viii.1953 (*J. Verbeke*), holotype and 5 paratypes in Institut Royal des Sciences Naturelles de Belgique, 3 paratypes in British Museum.

Procladius (Procladius) maculosus Freeman

I now have a male of this species. It is very similar to the female; A.R. 1.5, plumes whitish, darker apically; thorax and wings as in the female; legs white, tibiae and tarsal segments 1-3 black at apices, segments 4-5 totally black, L.R. 0.75. Abdomen whitish, each segment dark and with dark hairs at base.

SUDAN: 1 ♂, Liednum, nr. Wau, iii-iv.1955 (*E. T. M. Reid*).

SUBFAMILY ORTHOCLADIINAE

The following is a definition of the subfamily: Eyes typically reniform, seldom with dorsal narrow portion; male antennae normally plumose and with 14 segments, female antennae usually with 5-7 segments. Pronotum collar-like, never divided into separate lateral lobes, postnotal furrow usually distinct; anepisternal suture well developed. Anterior tibia always with a distinct spur, anterior basitarsus always shorter than tibia; middle tibia usually with two spurs and no comb; posterior tibia usually with two spurs, the inner the longer, and usually with a comb of free spinules on the inner side. True base of M_{3+4} never developed, R_{2+3} never connected to R_1 by a cross-vein, R_{4+5} not fused with costa to form a clavus. Hypopygium not inverted, styles movable, folded inwards in repose (except perhaps in some species of *Smittia* Wulp and ? *Knepperia* Kieffer).

I have seen material of more than 80 species of this subfamily from Africa south of the Sahara. With certain exceptions, such as some species of *Cricotopus* and occasional species of other genera, the Orthocladiinae are most abundant in, and typical of, South Africa and the mountainous areas of East Africa. As mentioned in Part I this is in accordance with the work of entomologists studying the fauna of the Palaearctic Region where it has been noted that the Orthocladiinae are especially typical of cold water habitats.

An interesting feature is the great similarity between the African and European Orthocladiine faunas. Sometimes I have been doubtful whether the species are really distinct. One East African species I have decided is identical with the European *Chaetocladius melaleucus* Meigen, and a South African species I have considered to be no more than a race of the European *Chaetocladius excerptus* Walker. Wherever possible I have mentioned the closest European ally and given reasons for considering them to be distinct. Most of the species fall into the groups and genera recognized by Edwards and Goetghebuer in their works on the British and Palaearctic species.

Edwards (1929, *Trans. ent. Soc. Lond.* 77, 279-430) used very large genera which he subdivided into subgenera, species groups and series. His classification basically is extremely sound, but the large genera are unwieldy and difficult to use. Later authors, especially Goetghebuer in Lindner's *Die Fliegen der Palaearktischen Region*, have discarded Edwards' concept of large genera, although they follow the main features of his basic classification.

Many Chironomids are hard to separate into clear-cut species and there is a good deal of intergrading. It follows that the differences at generic level are not always going to be strongly marked and there seems to be no reason why the allied species groups of Edwards' classification should not be considered as genera, and this I propose to do. My classification to a great extent follows that of Goetghebuer, but I have not hesitated to modify it where necessary.

Edwards (1929) brought forward a controversial issue in his use of the genus *Spaniotoma* Philippi. This entailed the use of a single large genus, *Spaniotoma*, for all the Orthocladiinae except *Metriocnemus*, *Brillia*, *Eurycnemus*, *Cricotopus* and *Cardiocladius* and some aberrant genera. *Orthocladius* was employed as a subgenus

TABLE I.—*Species of Orthocladiinae and Corynoneurinae Described by Kieffer*

Date.	Original name	Position in present study
1908	<i>Knepperia gracilis</i>	<i>Knepperia</i> gen. incert.
1911	<i>Dactylocladius mahensis</i>	<i>Smittia mahensis</i>
	<i>D. melanostolus</i>	<i>S. melanostolus</i>
	<i>D. xanthostolus</i>	<i>S. melanostolus</i>
	<i>D. heterostolus</i>	<i>S. melanostolus</i>
	<i>D. megalochirus</i>	<i>Orthocladius megalochirus</i>
	<i>Corynoneura seychellensis</i>	<i>Corynoneura seychellensis</i>
	<i>Metriocnemus mahensis</i>	<i>Metriocnemus mahensis</i>
	<i>Trichocladius 4-fasciatus</i>	<i>Cricotopus 4-fasciatus</i>
1913	<i>Allocladius niger</i>	<i>Smittia nigra</i>
	<i>Psectrocladius alpinus</i>	<i>Orthocladius alpinus</i>
	<i>Dactylocladius lacustris</i>	? <i>Orthocladius lacustris</i>
	<i>D. sancti-benedicti</i>	? <i>O. sancti-benedicti</i>
	<i>D. kinangopi</i>	? <i>O. kinangopi</i>
	<i>Nanocladius vitellinus</i>	<i>Nanocladius vitellinus</i>
1914	<i>Camptocladius natalensis</i>	<i>Limnophyes natalensis</i>
	<i>C. capensis</i>	? <i>Smittia capensis</i>
1918	<i>Camptocladius pretorianus</i>	? <i>Orthocladius pretorianus</i>
	<i>C. guineensis</i>	<i>Smittia guineensis</i>
	<i>C. nigerrimus</i>	<i>Orthocladius nigerrimus</i>
	<i>Dactylocladius micans</i>	<i>Trichocladius micans</i>
	<i>D. pallidus</i>	<i>Chaetocladius pallidus</i>
	<i>Trichocladius guineensis</i>	? <i>Trichocladius guineensis</i>
1923	<i>Kribiocladius flava</i>	? <i>Thienemanniella flava</i>
	<i>Dactylocladius nilicola</i>	? <i>Orthocladius nilicola</i>
	<i>Trichocladius atriclava</i>	<i>Cricotopus atriclava</i>
	<i>T. albiclava</i>	? <i>Trichocladius albiclava</i>
	<i>T. pictiventris</i>	<i>Cricotopus pictiventris</i>
	<i>T. kribiensis</i>	<i>Cricotopus albitibia</i> Walker
	<i>Camptocladius longicosta</i>	<i>Smittia guineensis</i> Kieffer
	<i>C. kribiensis</i>	? <i>Smittia kribiensis</i>
1924	<i>Psectrocladius rhodesiae</i>	<i>Cryptochironomus</i> (!)—see under <i>Psectrocladius</i> .

TABLE II.—*Species of Orthocladiinae and Corynoneurinae Described by Goetghebuer*

Date	Original name	Position in present study
1934	<i>Cricotopus kisantuensis</i>	<i>Cricotopus kisantuensis</i>
	<i>C. bicinctus</i> var. <i>plumbeus</i>	<i>C. albitibia</i> Walker
	<i>C. tricinctellus</i>	<i>C. tricinctellus</i>
	<i>C. dewulfi</i>	<i>Trichocladius micans</i> Kieffer
	<i>C. cereofasciatus</i>	<i>T. cereofasciatus</i>
	<i>Limnophyes brevis</i>	<i>Limnophyes natalensis</i> Kieffer
	<i>Eukiefferiella metallescens</i>	<i>Trichocladius metallescens</i>
	<i>Smittia longicostalis</i>	<i>Smittia guineensis</i> Kieffer
1935	<i>Corynoneura dewulfi</i>	<i>Corynoneura dewulfi</i>
	<i>Thienemanniella chambiensis</i>	<i>Stempellina chambiensis</i> (!)
	<i>T. trivittata</i>	<i>Thienemanniella trivittata</i>
1936	<i>Metriocnemus dewulfi</i>	<i>Metriocnemus dewulfi</i>
	<i>Smittia maculipennis</i>	<i>Smittia maculipennis</i>

of *Spaniotoma*. It seems to me that the identity of *Spaniotoma* is in doubt, as Edwards himself admits in a footnote (1929, 327) and I am not prepared to accept this name for the larger part of the subfamily. The use of smaller genera automatically restricts *Spaniotoma* and I am proposing to reject it on grounds of uncertain identity.

Edwards (1940, *Proc. R. ent. Soc. Lond.* (B) 9, 154-6) later suggested that *Spaniotoma* should be replaced by the earlier name *Hydrobaenus* Fries. *Hydrobaenus* was originally proposed for a somewhat aberrant species which, according to Edwards, has been redescribed by both Kieffer and Goetghebuer in the genus *Trissocladius*. Again, with the use of smaller genera, *Hydrobaenus* is best regarded as a separate genus, leaving *Orthocladius* as a full genus.

Neither the genera nor the species of the Orthocladiinae are easy to separate. A useful character lies in the size of the microtrichia on the wing membrane. If the wing of a dry or slide-mounted specimen of a species without macrotrichia on the membrane is examined under a monocular microscope then the microtrichia can readily be seen as distinct hairs only in the two genera *Chaetocladius* and *Limnophyes*. Sometimes a 2/3 in. objective is sufficient, with other species a 1/6 in. objective may be necessary. Edwards tried to correlate the size of the microtrichia with the colour of the wings as seen by transmitted light: where they were distinguishable the wing was colourless, where they were either absent or too small to be distinguished as hairs, then the wing showed some brown or purple colour. I prefer to look for the microtrichia themselves rather than to rely on the colour character, though it often acts as an indication.

Kieffer has described 30 species of Orthocladiinae from Africa south of the Sahara, I have seen the types of 17 of these. Table I shows either their true position in a modern classification, or their estimated position for those in which the types are lost and the description poor. Each is discussed under its appropriate genus.

Goetghebuer has described nine species and one variety of a Palaearctic species. I have seen the types of all of his species which are in Musée Royal du Congo Belge. Table II shows his species with their appropriate positions in this Study.

KEY TO GENERA OF ORTHOCLADIINAE KNOWN FROM AFRICA SOUTH OF THE SAHARA

(*Knepperia* Kieffer omitted owing to insufficient data)

- | | | |
|--|------------------------------|---|
| 1. Wing membrane bearing macrotrichia, at least at apex | <i>Metriocnemus</i> Wulp | |
| Wing membrane without macrotrichia | | 2 |
| 2. Vein R ₂₊₃ running close to R ₄₊₅ , obsolete apically and not ending distinctly in costa | <i>Nanocladius</i> Kieffer | |
| R ₂₊₃ not like this, ending distinctly in costa | | 3 |
| 3. Squama completely bare | | 4 |
| Squama with at least a partial fringe of 2-3 hairs, usually with a complete fringe | | 5 |
| 4. Postnotum with well developed fissure; tibial spurs present on middle legs; eyes occasionally with short pubescence, usually bare | <i>Smittia</i> Holmgren | |
| Postnotal fissure absent; spurs absent from middle tibiae; eyes densely pubescent; male antenna 6-segmented | <i>Harrisonina</i> gen. nov. | |
| 5. Eyes pubescent | | 6 |
| Eyes bare | | 7 |

- | | | |
|-----|---|-------------------------------|
| 6. | Dorso-central hairs minute and decumbent, tibiae often with white ringe or completely white, humeral pits small | <i>Cricotopus</i> Wulp |
| | Dorso-central hairs erect and normal ; tibiae not ringed ; humeral pits often large | <i>Trichocladius</i> Kieffer |
| 7. | Fourth tarsal segment cordiform | <i>Cardiocladius</i> Kieffer |
| | Fourth tarsal segment cylindrical | 8 |
| 8. | Pulvilli large and broad | <i>Psectrocladius</i> Kieffer |
| | Pulvilli small, narrow or absent | 9 |
| 9. | Wing membrane without microtrichia distinguishable under $\frac{1}{6}$ in. objective ; membrane usually brownish by transmitted light | <i>Orthocladius</i> Wulp |
| | Microtrichia easily distinguishable with $\frac{1}{6}$ in. objective ; membrane colourless by transmitted light | 10 |
| 10. | Cu_1 strongly bent near the middle ; posterior fork well beyond r-m cross-vein ; anal lobe of wing reduced | <i>Limnophyes</i> Eaton |
| | Cu_1 not strongly bent, often almost straight ; posterior fork below or only slightly beyond r-m ; anal lobe present | <i>Chaetocladius</i> Kieffer |

Genus *METRIOCNEMUS* van der Wulp

Metriocnemus van der Wulp, 1874, *Tijdschr. Ent.* 17, 136 ; Kieffer, 1911, *Trans. Linn. Soc. Lond.*, (Zool.) 14, 360 ; Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 310 ; Goetghebuer, 1936, *Rev. Zool. Bot. Afr.* 28, 491.

Wings with distinct macrotrichia on the membrane, at least at the tip ; cross-vein r-m rather short ; eyes bare (in African species) ; pulvilli absent ; scutum not produced in front, pronotum forming a distinct collar ; male styles not bifid ; hind tibiae with comb as usual.

All the species of Orthocladiinae with macrotrichia on the wing membrane known to me from Africa fall into this genus. They are quite similar to Palaearctic species. Not all the species groups recognized by Edwards (1929) are represented, groups B and C being absent and D, E and F not clearly separable. For these reasons, I am not adhering closely to Edwards' groupings. I have seen specimens of all the described species but it seems probable that there are still quite a number of species to be found, especially in the mountainous parts of Africa.

KEY TO AFRICAN SPECIES OF *Metriocnemus*

- | | | |
|----|---|--------------------------|
| 1. | Shoulders and mesonotum blackish or blackish brown | 2 |
| | Shoulders yellow, mesonotal stripes brown, often separated | 7 |
| 2. | Macrotrichia confined to tip of wing (at least in male), acrostichal bristles absent, anal lobe of male prominent | <i>fletcheri</i> sp. n. |
| | Macrotrichia evenly and densely distributed over most of wing or at any rate over apical half and margin of anal cell, anal lobe slight | 3 |
| 3. | Acrostichal bristles present, wing length at least 2.0 mm. | 4 |
| | Acrostichal bristles absent, wing length 2.0 mm. or less | 6 |
| 4. | Macrotrichia more sparse, present at most only on apical half of wing of male and along margin of anal cell, female unknown | <i>lobeliae</i> sp. n. |
| | Macrotrichia evenly and densely distributed over entire wing surface | 5 |
| 5. | Male styles narrowed at apex, anal point short (Text-fig. 3, b) | <i>canus</i> Freeman |
| | Male styles wide at apex, anal point longer | <i>wittei</i> Freeman |
| 6. | Anal point of male long (Text-fig. 3, g) | <i>fordi</i> sp. n. |
| | Anal point of male very short (Text-fig. 3, f) | <i>capensis</i> sp. n. ♂ |

- | | |
|---|----------------------------|
| 7. Squama bare, macrotrichia very restricted in only known male, only present at extreme apex, in female with bare lines along veins. | 8 |
| Squama fringed, macrotrichia more abundant | 9 |
| 8. Posterior fork narrower, similar to <i>fordi</i> (Text-fig. 2, f), female without macrotrichia nearer to anterior margin than apex of costa | <i>benoiti</i> sp. n. |
| Posterior fork distinctly wider, Cu ₁ more sharply bent, female with macrotrichia anterior to apex of costa, species from Seychelles | <i>mahensis</i> Kieffer |
| 9. Large species wing length 3.0 mm., eyes of male without dorsal narrow portion | <i>conicus</i> Freeman |
| Wing length 2.0 mm. or less | 10 |
| 10. Acrostichal bristles absent, L.R. practically 1.0 | <i>capensis</i> sp. n. ♀ |
| Acrostichal bristles present, L.R. at most 0.8 | 11 |
| 11. Costa retracted (Text-fig. 2, d) | <i>dewulfi</i> Goetghebuer |
| Costa longer (Text-fig. 2, c) | <i>scotti</i> Freeman. |

***Metriocnemus wittei* Freeman**

Metriocnemus wittei Freeman, 1955, *Explor. Parc Nat. Albert*, Miss. G. F. de Witte, fasc. 83, 9.

This species is a typical member of Edwards' Group A. It is all black, halteres dark, thoracic bristles usually pale, wings densely hairy all over, anal lobe of wing not produced, male styles not narrowed at apex, anal point bare and of medium length.

It seems to be quite variable, some specimens having golden thoracic hairs, others having these hairs darker or almost blackish. In addition, in the types series A.R. is 2.5, but in other specimens it may be as low as 1.0. The insects are so generally similar that I hesitate to place these in a separate species.

Male. Wing length 2.0-2.5 mm.

Head black, palpi normal; eyes bare and without narrow portion; vertex with a few whitish hairs but lacking scale tufts; antennal plumes blackish, A.R. varying from 1.0 to 2.5. *Thorax* completely black, slightly shining, somewhat pruinose along the hair lines; acrostichal bristles varying from golden yellow to blackish and more or less uniserial, dorso-centrals similarly coloured and irregularly triserial, becoming more regular and numerous on shoulders. *Legs* blackish with black hairs; front L.R. 0.7, hind L.R. 0.45 or slightly less, pulvilli absent, empodium well developed. *Wings* yellowish basally, densely and evenly clothed with macrotrichia, stem vein and squama with well developed long hairs, anal lobe slight (Text-fig. 2, a); venation as in Text-fig. 2, a, R₂₊₃ ending nearer R₁, costa produced, R₄₊₅ ending before level of tip of M₄, posterior fork fairly narrow, Cu evenly curved, anal vein reaching fork. Halteres black or dark brown. *Abdomen* black, very slightly paler at the incisures, hairs mostly blackish. Hypopygium (Text-fig. 3, a) with well developed bare anal point, inner coxite lobe slightly developed, style not narrowed at apex.

Female. Generally similar to male, abdomen rather browner, wings with the usual sexual differences of greater breadth and denser macrotrichia.

Holotype in collection of Institut des Parcs Nationaux du Congo Belge.

DISTRIBUTION. ABYSSINIA: 1 ♂, Koram Plain, 3.xi.36 (*J. W. S. Macfie*). UGANDA: 1 ♂, 3 ♀, Musandama, 8,000 ft., xi.31 (*E. G. Gibbins*); 1 ♂, Ruwenzori Range, Mahoma River, 6,700 ft., viii.52 (*D. S. Fletcher*). BELGIAN CONGO: 1 ♂, N.

Kivu, Kibati, x.33 (*de Wulf*); type and paratype, Lac Magera, 2,000 m., iii.34 (*G. F. de Witte*). TRANSVAAL: 1 ♂, Pretoria, Lynnwood, iii.54 (*Rudebeck*).

Gibbins' specimens were bred from larvae found in the axils of wild bananas, a habitat similar to that of the Palaearctic species *M. martinii* Thienemann, which breeds in water in rot-holes in trees.

Metriocnemus lobeliae sp. n.

Very similar to *M. wittei*, but thoracic hair all jet black and wing membrane of male (female unknown) with reduced macrotrichia. It may be a variety of *wittei*, especially as the breeding habitat is similar.

Male. Wing length 2.5 mm.

Head black, eyes without dorsal narrow portion, vertex with a few dark hairs, antennae blackish, plumes dark, A.R. about 1.5. *Thorax* completely black, slightly shining and pruinose, except for scutellum, which is paler; all hairs black, acrostichal bristles well developed, dorso-centrals irregularly biserial. *Legs* black; similar to *wittei*, except front L.R. 0.5, but this may be variable. *Wings* yellowish basally, with similar venation to *wittei* (Text-fig. 2, a); macrotrichia much sparser, in basal half of wing only present as a single or double row just inside margin of

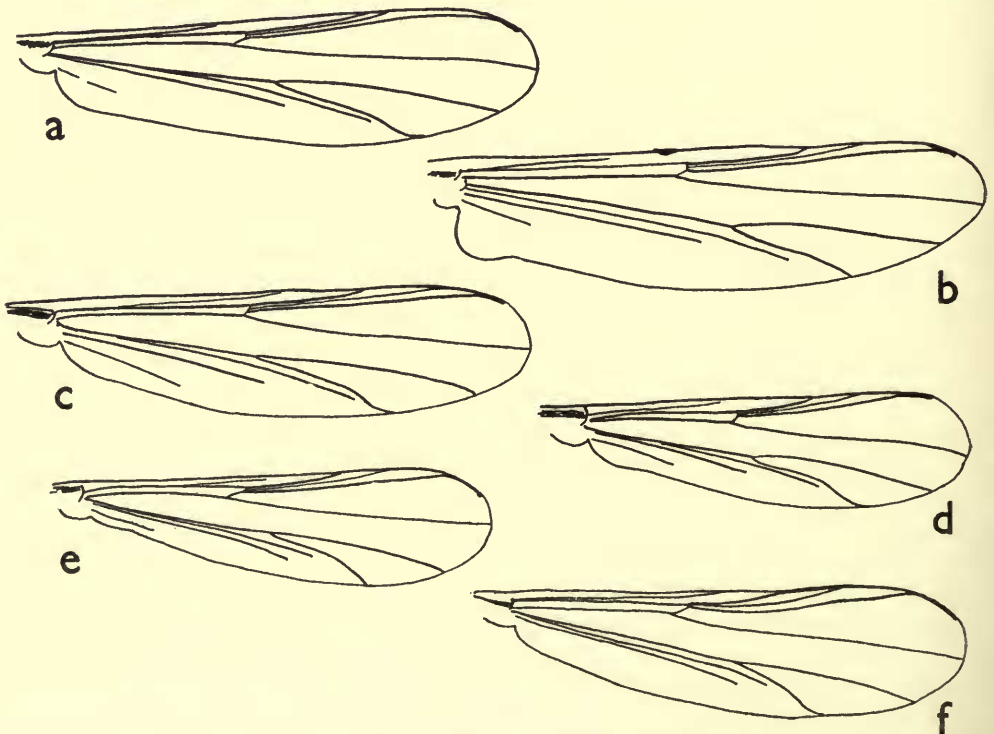


FIG. 2. Wings of male *Metriocnemus*. (a) *M. wittei*; (b) *M. fletcheri*; (c) *M. scotti*; (d) *M. dewulfi*; (e) *M. capensis*; (f) *M. fordii*.

anal cell; in apical half present at tips and sparsely along cells R_5 and M_2 , cell M_4 with a few at apex. *Abdomen* and hypopygium similar to *wittei*; anal point possibly rather shorter, but this may be variable.

Female not known.

Holotype male and paratype 1 ♂, KENYA: Aberdare Range, Mt. Kinangop, 12,000 ft., x.34 (*F. W. Edwards*).

Both specimens were bred from larvae found in leaf axils of *Lobelia sattimae*.

Metriocnemus canus Freeman

Metriocnemus canus Freeman, 1954, *Arch. Hydrobiol.* 48, 441.

This species is also a typical member of Edwards' Group A and is very similar to *wittei*, from which it is best distinguished by the male hypopygium, the styles being narrower apically and the anal point shorter; thorax quite strongly pruinose, wings yellowish basally.

Male. Wing length 3.0 mm.

Head black, palpi brown, antennae dark, plumes black, A.R. 1.0. *Thorax* quite black, pruinose and rather shining; mesonotum seen from behind with two admedian grey pruinose stripes lying between the dorso-central and acrostichal bristles, lateral and prescutellar areas less pruinose; seen from different angles the pattern changes; dorso-central bristles in about three rows, additional bristles present on shoulders and above wings, bristles pale or black. *Legs* almost black; front L.R. about 0.5, hind L.R. about 0.4, pulvilli absent. *Wings* yellowish basally, membrane clothed all over with dark macrotrichia, squama strongly fringed, venation exactly similar to *wittei* (Text-fig. 2, a), anal lobe similarly small. Halteres brown. *Abdomen* blackish brown, paler at the incisures and at the extreme base; hypopygium (Text-fig. 3, b) with short but distinct anal point, IXth tergite hairy, coxite with small inner lobe near apex, styles slightly thicker basally, narrow at apex.

Female. Wing length 3.4 mm.

Similar to male, abdomen rather browner, antennae with last segment hardly longer than preceding one.

Holotype in British Museum.

DISTRIBUTION. KENYA: 2 ♂, Aberdare Range, Nyeri Track, 10,500 ft. x.34 (*F. W. Edwards*) (type locality). UGANDA: 1 ♀, Kigezi Distr., Mt. Muhavura, 10-12,000 ft., vii.52 (*D. S. Fletcher*). BELGIAN CONGO: 1 ♂, Parc National Albert, Nyiragongo, limit of vegetation, 3,000 metres, 1933 (*de Wulf*).

Metriocnemus fletcheri sp. n.

An all black species readily distinguished from the previous ones by the absence of acrostichal bristles, the prominent anal lobe to the wing, the reduced wing macrotrichia and by the hairy anal point of the male.

Male. Wing length 2.5 mm.

Head, mouthparts, antennae and plumes black; A.R. about 2.0, eyes bare and without dorsal narrow portion. *Thorax* completely black, rather shining and slightly

pruinose; dorso-central bristles long, black and uniserial, acrostichals appear to be absent. *Legs* dark brown or blackish, anterior L.R. 0.75, posterior 0.6. *Wings* yellowish basally, anal lobe prominent (Text-fig. 2, *b*), venation not unlike *wittei*, posterior fork rather shorter; macrotrichia black and reduced in number, present only at apices of cells R_5 and M_1 , and at extreme tip of fork cell; halteres blackish. *Abdomen* black and with black hairs; hypopygium (Text-fig. 3, *d*) differing from the other species not only in the presence of a definite coxite lobe and in the shape of the style, but also because the main area of the ninth tergite is bare, whilst the long anal point is hairy.

Female not known.

Holotype male and 2 male paratypes, UGANDA: Ruwenzori Range, Mahoma River, 6,700 ft., viii. 52 (*D. S. Fletcher*). TANGANYIKA: 8 ♂, Amani iv. 1955 (*M. T. Gillies*). Holotype and all paratypes in British Museum.

Metriocnemus conicus Freeman

Metriocnemus conicus Freeman, 1955, *Explor. Parc Nat. Albert*, Miss. de Witte, fasc. 83, 8.

A large and distinctive blackish species, distinguished from the other black species by the separate scutal stripes. *Wings* densely clothed with macrotrichia over whole surface, R_{4+5} and costa longer than usual, anal point probably broken in the unique specimen.

Male. Wing length 3.0 mm.

Head brownish black, eyes bare, without dorsal narrow portion, vertex with tufts of scale-like hairs of a golden brown colour; antennal plumes dark, A.R. about 1.8. *Thorax* mainly black; mesonotal stripes dull blackish and separated; shoulders, lines of bristles, lateral margins, apex of scutellum, pleural membrane, wing bases and prothorax, yellowish and pruinose. Acrostichal bristles golden brown, uniserial; dorso-centrals also golden brown, irregularly biserial and tending to disappear on the shoulders. *Legs* dark brown, anterior L.R. about 0.75, posterior tarsi missing, pulvilli and empodium both absent. *Wings* with membrane thickly clothed with macrotrichia which are numerous in cell M_1 right to the wing base; venation not unlike *wittei* but costa longer and R_{4+5} ending well beyond M_4 , Cu_1 not bent, anal vein passing fork; stem vein and squama abraded, but both probably hairy. Halteres yellow, stem slightly brownish. *Abdomen* black, with some pruinosity along the mid-dorsal line and at the incisures; hairs pale. Hypopygium (Text-fig. 3, *c*) apparently lacking anal point, but this is probably broken off; IXth tergite hairy and conical, inner lobe of coxite hardly developed, style fairly thick and with a small apical spine.

Holotype male in collections of Institut des Parcs Nationaux du Congo Belge, type locality, BELGIAN CONGO: Ruanda, Sabinyo (Volc.), Vall. Rwebeya, 3,000 m., ix. 34 (*G. F. de Witte*). No other specimens known.

Metriocnemus scotti Freeman

Metriocnemus scotti Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 129.

This is the most widely distributed of the African species and seems to belong to Edwards' Group E. It is a medium-sized brown species with separate scutal stripes,

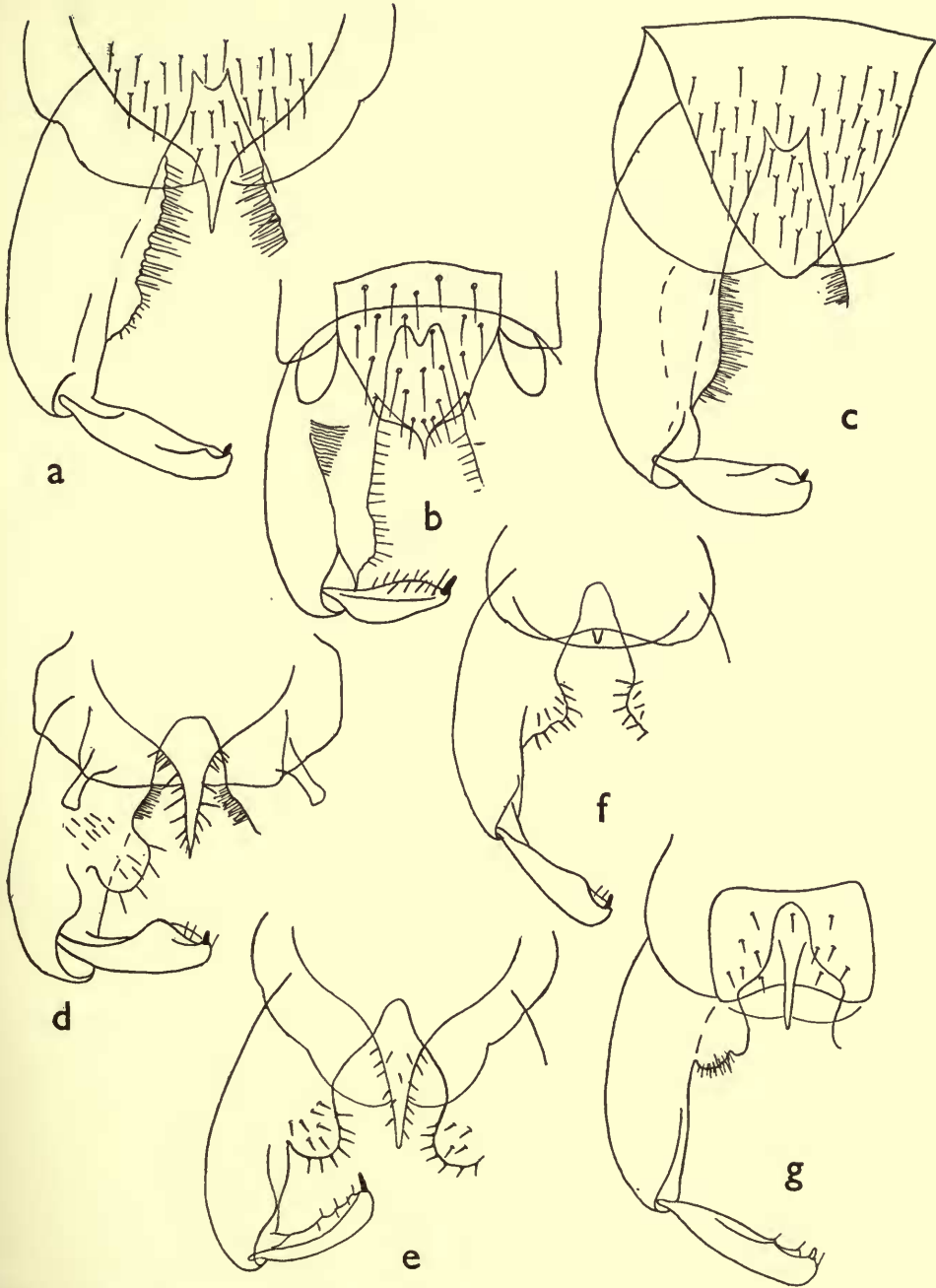


FIG. 3. Male hypopygia of *Metriocnemus*. (a) *M. wittei*; (b) *M. canus*; (c) *M. conicus*; (d) *M. fletcheri*; (e) *M. scotti*; (f) *M. capensis*; (g) *M. fordii*.

eyes of male with dorsal narrow portion, anal point hairy. Distinguished from *dewulfi* by the longer costa and greater number of macrotrichia on the wing.

Male. Wing length 1.75–2.0 mm.

Head yellow or brown, mouthparts darker, pedicel dark brown, A.R. about 0.8–1.0, antenna with about 10 curly hairs at apex, eyes with dorsal narrow portion. *Thorax* with yellow ground colour; mesonotal stripes separate, brown, central one more or less divided, intervening spaces and shoulders pruinose; scutellum yellowish, postnotum and sternopleuron brown. *Legs* yellowish brown, unmarked and hairy; L.R. 0.75, of posterior legs 0.6; pulvilli absent. *Wings* hyaline, macrotrichia present quite thickly over most of the surface, absent for a narrow tract along each vein, so that in the basal half of the posterior fork there is only a single row; venation as in Text-fig. 2, c, posterior fork directly below r-m, Cu with a double bend. Halteres pale. *Abdomen* brown; hypopygium as in Text-fig. 3, e, similar to that of *dewulfi*, anal point hairy, IXth tergite bare, coxite lobe prominent.

Female. Resembles male; wing hairs denser, so that basal half of posterior fork has two or three rows.

Holotype male in British Museum.

DISTRIBUTION. ABYSSINIA: 1 ♂, 1 ♀, Dessie, xii.35–i.36 (*J. W. S. Macfie*). KENYA: 1 ♂, Aberdare Range, Mt. Kinangop, 8,000 ft., x.34 (*F. W. Edwards*). UGANDA: 1 ♂, Ruwenzori Range, Kilembe, 4,500 ft., xii.34–i.35 (*F. W. Edwards*). N. RHODESIA: 1 ♂, Chilanga, vii.1913. NATAL: 1 ♂, 2 ♀, Tugela River, Drakensberg, 5,000 ft. (*A. D. Harrison*). CAPE PROVINCE: various specimens from Kirstenbosch (type locality), Platteklip Gorge and Assegaibos (*K. M. F. Scott*).

Metriocnemus dewulfi Goetghebuer

Metriocnemus dewulfi Goetghebuer, 1936, *Rev. Zool. Bot. Afr.* 28, 491; Freeman, 1955, *Explor. Parc. Nat. Albert*, Miss. de Witte, fasc. 83, 8.

This species resembles *scotti* in the male hypopygium and in colour, but it is clearly distinct because of the retracted costa, reduced wing macrotrichia and shorter narrow part of the eye of the male; also it is smaller. It appears on some characters to fall into Edwards' Group D, but on others into Group E.

Male. Wing length 1.25 mm.

Head and mouthparts brown; antennae dark brown, A.R. about 1.0, apex of antenna with about 4 long curled hairs. *Thorax* yellowish with separate brown stripes, postnotum and sternopleuron brown; acrostichal hairs present, dorso-centrals more or less uniserial. *Legs* brown, anterior L.R. 0.8, posterior 0.65, empodium present, pulvilli absent. *Wings* (Text-fig. 2, d) somewhat cuneiform, costa retracted, R₄₊₅ ending well before level of tip of M₃₊₄; macrotrichia reduced, hardly present in basal half of wing except in anal cell, a few sometimes in cell M. Squama fringed, halteres yellow. *Abdomen* brown, hypopygium apparently identical to that of *scotti* (Text-fig. 3, e).

Female. Resembles male, but costa longer and wings more densely clothed with macrotrichia, extending into basal half; best separated from *scotti* by its smaller size.

I have seen the holotype, which is a male in Musée Royal du Congo Belge, Tervuren.

DISTRIBUTION. Type locality BELGIAN CONGO: Rutshuru; besides the type I have seen 7 ♂, 3 ♀, Rutshuru, 1285 m., xii.33 and 2 ♂, 1 ♀, i.34 (*G. F. de Witte*). NATAL: 1 ♂, Mooi River, Keate's Drift, x.1954 (*W. D. Oloff*). TRANSVAAL: 2 ♀, nr. Johannesburg, iv.1955 (*A. D. Harrison*). S. RHODESIA: 1 ♂, Salisbury, ix-x.1954 (*E. T. M. Reid*).

Metriocnemus capensis Freeman

Metriocnemus capensis Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) **23**, 173.

A small species, male blackish, female yellowish brown; acrostichal bristles absent, eyes lacking dorsal narrow portion in male; A.R. only 0.25, L.R. about 1.0, costa strongly produced, squama fringed. This species falls best into Edwards' Group E.

Male. Wing length 1.4 mm.

Head, mouthparts and antennae blackish, eyes bare, without dorsal narrow portion, last antennal segment short, so that A.R. only about 0.25, apex with short hairs only. *Thorax* entirely blackish brown, slightly pruinose, acrostichal bristles absent, dorso-centrals biserial. *Legs* brown, L.R. of front pair practically 1.0, of hind pair 0.6, pulvilli absent, empodium well developed. *Wings* with a brownish tinge, clothed over most of the surface with macrotrichia which are absent only from the anterior part of the basal third; costa strongly produced, reaching half-way to M, R₂₊₃ ending about midway between R₁ and R₄₊₅, the latter ending about M₃₊₄ (Text-fig. 2, e); stem vein and squama each with a single hair. Halteres pale. *Abdomen* dark brown, hypopygium (Text-fig. 3, f) with extremely short anal point, coxite lobe moderately developed.

Female. Much paler than male, yellowish brown, scutal stripes sometimes only vaguely indicated, wing macrotrichia denser, costa rather longer, squama with 1-2 hairs.

Holotype male in British Museum.

DISTRIBUTION. Known only from the type series, CAPE PROVINCE: Berg River, Assegaibos, vii.1952, v.1953 and viii.1953 (*K. M. F. Scott*).

Metriocnemus fordi sp. n.

A medium-sized species, blackish brown in colour, wings of male with macrotrichia on the apical half and in the anal cell. Thoracic stripes fused, acrostichal bristles absent, costa strongly produced, anal lobe absent, squama fringed; anal point bare, eyes without narrow dorsal portions. Resembles *capensis* most closely, but easily distinguished from it and from other species by the long bare anal point.

This species does not fit easily into any of Edwards' groups. In his key it runs into Group E, but cannot be placed here because the eyes are reniform; it is precluded from Group F by the presence of a squamal fringe.

Male. Wing length 1.8-2.0 mm.

Head dark brown, eyes bare and reniform, palpi yellowish, antennal pedicel dark brown, flagellum and plumes paler, A.R. varying from 0.75 to 1.0. *Thorax* blackish

brown, acrostichal bristles absent, dorso-centrals present, pale and biserial; thorax pruinose along the hair lines. *Legs* pale brown, L.R. of anterior legs 0.9, of posterior legs 0.6, pulvilli absent, empodium well developed. *Wings* (Text-fig. 2, *f*) with macrotrichia on apical half of wing and in the anal cell only, squama with partial fringe, anal lobe reduced, but not as small as in *capensis*; venation very similar to *capensis*, costa strongly produced, posterior fork well distal to crossvein. *Abdomen* dark brown; hypopygium (Text-fig. 3, *g*) quite characteristic, anal point long and bare, ninth tergite slightly emarginate apically and with some hairs, coxite lobe more or less bilobed, styles narrow and with two projections near apex.

Female not known.

Holotype male and 9 ♂ paratypes, UGANDA: Kigezi Province, summit of Mt. Sabinio, 11-11,500 ft., xi. 1934 (*J. Ford*) all in British Museum.

Metriocnemus benoiti sp. n.

As explained under *Limnophyes*, Goetghebuer described his species *L. brevis* from a mixed series which included specimens of a species of *Metriocnemus*. This is a small species not unlike a number of others, but by far the closest to *M. mahensis* Kieffer from Seychelles, which it resembles in the wings of the female and in the bare squama. The male is not unlike *dewulfi* and has similar genitalia, but the macrotrichia are greatly reduced and the apex of the antenna lacks long curled hairs. It is distinguished from *mahensis* by the slightly narrower posterior fork and the fewer macrotrichia on the wing. I am naming this species in honour of Dr. P. L. G. Benoit, who has given me so much help with the types of Goetghebuer's species. It falls into Group F of Edwards' classification.

Male. Wing length 1.1 mm.

Head, mouthparts and antennae brown, A.R. 0.75, antennae with short hairs at apex, no long curled ones present; head of type sunken and eye shape difficult to see, but dorsal narrow portion probably absent. *Thorax* dark brown with some pruinosity along lines of dorso-central hairs; shoulders and upper parts of pleura yellow, stripes fused; acrostichal hairs cannot be seen. *Legs* yellowish brown, anterior L.R. 0.8, posterior 0.65, empodium present, pulvilli absent, *Wings* in shape and venation similar to *fordi* (Text-fig. 2, *f*), but costa only produced for about half the distance; squama bare, membrane with greatly reduced macrotrichia which are present only at extreme apex and as a central line in apical half of cell R₅. Halteres brown. *Abdomen* blackish, hypopygium similar to *scotti* and *dewulfi* (Text-fig. 3, *e*).

Female with scutal stripes partially separated, lines of bristles pruinose, wings with denser macrotrichia than male but fewer than *mahensis*. Macrotrichia more or less in lines reaching nearly to wing base, leaving bare lines along the veins, none nearer anterior margin than the greatly produced apex of the costa, well distributed in anal cell; venation very similar to *fordi*, posterior fork distinctly narrower than in *mahensis*.

Holotype male and paratype one female, BELGIAN CONGO: Kisantu, 1937 (*de Wulf*), both in Musée Royal du Congo Belge.

Metriocnemus mahensis Kieffer

Metriocnemus mahensis Kieffer, 1911, *Trans. Linn. Soc. Lond. (Zool.)* **14**, 360.

This species was described from two females closely resembling the female of *M. benoiti*. Thorax more uniformly brown, stripes not separated, though pruinose along lines of dorso-central bristles; squamal hairs absent, macrotrichia leaving well marked bare lines along the veins, but reaching clearly anterior to tip of costa; posterior fork slightly but distinctly wider than in *benoiti*, Cu_1 more sharply bent. In the absence of males it is difficult to be more precise. The bare squama places it in group F of Edwards' classification.

One type female in British Museum, SEYCHELLES: Mahé, Cascade Estate, 800-1,500 ft.

Genus *CRICOTOPUS* van der Wulp

Cricotopus van der Wulp, 1874, *Tijdschr. Ent.* **17**, 132; Edwards, 1929, *Trans. ent. Soc. Lond.* **77**, 317; Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* **25**, 200 (in part); Freeman, 1953, *Proc. R. ent. Soc. Lond. (B)* **22**, 130.

Trichocladius Kieffer, 1923, *Ann. Soc. ent. France* **92**, 182 (in part).

Eyes densely pubescent; humeral pits small; dorso-central hairs minute and decumbent, the punctures from which they arise scarcely visible under a binocular microscope; abdomen often with yellow markings, hypopygium and cerci of female often white; hypopygium lacking anal point; tibiae, especially the anterior pair, often with a broad white ring; wings without visible microtrichia; squama fringed.

As defined above (following Edwards, 1929) this is a distinctive and easily defined genus, although the South American genus *Stictocladius* Edwards suggests that *Cricotopus* and *Trichocladius* are not really very widely separated. Goetghebuer and Kieffer seemed not always able to distinguish the two genera and their *Cricotopus* and *Trichocladius* contain a mixture of the two.

Kieffer described six African species in *Trichocladius*. Four of these seem to be *Cricotopus*; one (*T. guineensis*) is unrecognizable, but may be *Cricotopus*; the sixth, *T. albiclava*, has microtrichia on its wings and may belong to neither genus. I have seen the type series of one of his species only.

Goetghebuer described five species (including a variety of the Palaearctic species *bicinctus*) in the genus *Cricotopus*. Two of these, *cereofasciatus* and *dewulfi* belong to *Trichocladius*. I have seen the types of all his species.

I am recognizing 17 African species, seven of them new. They fall into two groups depending on the presence or absence of a white ring on the anterior tibia. In the group with the ring present, three subsidiary groups can be recognized according to the ornamentation of the abdomen, whether it is black with shining rings, or black with yellow rings, or brown and yellow.

KEY TO AFRICAN SPECIES OF *Cricotopus*

- | | |
|--|----|
| 1. Anterior tibiae with white ring or white with black apex, or completely white | 2 |
| Anterior tibiae uniformly brown, without white markings | 13 |
| 2. Abdomen either entirely black or black with brilliant steely blue bands | 3 |
| Abdomen with yellow or leaden yellow markings | 6 |

- | | | | |
|-----|--|----------------------------------|----|
| 3. | Legs mainly yellow, knees black | <i>rodriguensis</i> Edwards | |
| | Legs black except for white ring on at least front tibiae | | 4 |
| 4. | White ring on front tibia only | | 5 |
| | White rings on front and middle tibiae | <i>harrisoni</i> sp. n. | |
| 5. | Abdomen black, without shining bands | <i>atriclava</i> Kieffer | |
| | Abdomen with steely shining bands | <i>kisantuensis</i> Goetghebuer | |
| 6. | Abdomen black and yellow or black and leaden yellow; thoracic stripes usually black and fused at least in the male (c.f. <i>dibalteatus</i> sp.n.). | | 7 |
| | Abdomen brown and yellow, thoracic stripes brown and separate | | 11 |
| 7. | Anterior tibiae white with only the tip black | | 8 |
| | Anterior tibiae white with tip and base black | | 9 |
| 8. | Yellow markings on segments 1, 2, 3, 4 | <i>pictiventris</i> Kieffer | |
| | Yellow markings on segments 1, 4, 7 | <i>tricinctellus</i> Goetghebuer | |
| 9. | Yellow markings on both segments 4 and 5 | <i>flavozonatus</i> Freeman | |
| | Yellow or leaden markings on segment 4, segment 5 black | | 10 |
| 10. | Posterior tibia white with dark tip; anterior tibia with apical black band about twice as long as basal; abdominal bands leaden yellow; thoracic stripes fused | <i>albitibia</i> Walker | |
| | Posterior tibiae brown; anterior tibiae with basal and apical dark markings equal; abdominal bands clear yellow; thoracic stripes brownish black, may be partially separated | <i>bizonatus</i> sp. n. | |
| 11. | Anterior tibia entirely white; wing of male more or less cuneiform, anal angle not developed; species from Seychelles | <i>quadrifasciatus</i> Kieffer | |
| | Anterior tibia with black tip; anal angle right-angled in male | | 12 |
| 12. | Abdominal segments 5-9 brown; all tibiae white with dark tips | <i>sudanicus</i> sp. n. | |
| | Abdominal segments 6 and 7 mainly yellow; only anterior tibia white with dark tip | <i>meilloni</i> sp. n. | |
| 13. | Abdomen with leaden or yellow markings | | 14 |
| | Abdomen without any markings | | 15 |
| 14. | Abdomen with segments 1, 4 and 7 yellow | <i>verbekei</i> sp. n. | |
| | Abdomen with leaden markings on segments 1, 2 and 5 | <i>dibalteatus</i> sp. n. | |
| 15. | Male coxite lobe obtuse, practically absent, costa distinctly produced | <i>scottae</i> sp. n. | |
| | Male coxite lobe more pronounced, costa hardly produced | | 16 |
| 16. | Male coxite lobe as in Text-fig. 4, <i>h</i> | <i>obscurus</i> Freeman | |
| | Male coxite lobe as in Text-fig. 4, <i>i</i> | <i>bergensis</i> Freeman | |

Cricotopus kisantuensis Goetghebuer

Cricotopus kisantuensis Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* **25**, 200.

Cricotopus fulgens Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) **22**, 130 (SYN. NOV.)

Black, thorax with steely blue sheen, abdomen with similar coloured bands on segments 1-4 and 6-9; only the anterior tibiae with a white ring, tarsi yellow, cerci of female yellow, male hypopygium black.

Goetghebuer inferred in his original description of this species that the tarsi were black and that abdominal segments 8-9 had no shining bands. Examination of the type shows that the tarsi are yellowish and that bands are present on the apical segments of the abdomen; my species therefore falls as a synonym.

Male. Wing length 2.0-2.2 mm.

Head dark, face paler, mouthparts brown, antennae and plumes dark, A.R. about 1.0. *Thorax* entirely black and shining with steely blue sheen, except for the scutellum

which is matt black. *Legs* black, tarsi and trochanters yellow, anterior tibia with a white ring placed so that about the basal and apical thirds are black; pulvilli practically absent, L.R. about 0.6. *Wings* with brown veins, cross-vein rather thick, costa slightly produced, anal lobe not produced, squama fringed. Halteres black. *Abdomen* black with steely blue shining bands as follows: segment 1 wholly shining, 2 shining on basal third, 3 shining on basal half to two-thirds, 4 completely shining, 5 completely matt black, 6 and 7 shining on basal halves, 8 and 9 with basal shining bands. Hypopygium black, with straight and rigid inner coxite lobe (Text-fig. 4, a), style lacking inner flange.

Female. Wing length 1.75–2.0 mm.

Very similar to male, wing veins seamed with brown, cerci bright yellow.

Holotype of *kisantuensis* in Musée Royal du Congo Belge, of *fulgens* in British Museum.

DISTRIBUTION: GOLD COAST: 3 ♀, Senchi, 1951 (*M. H. Hughes*). BELGIAN CONGO: 1 ♂, Kisantu; iii. 1931 (*de Wulf*) (holotype of *kisantuensis*); 1 ♂, Elisabethville, ii. 1939 and 1 ♂, iii. 1939 (*H. J. Brédo*). CAPE PROVINCE: 1 ♀, Berg River, Wellington, v. 1952 (holotype of *fulgens*); 1 ♂, 1 ♀, Krom River, Stellenbosch, xii. 52–i. 53, 1 ♂, Berg, River, French Hoek, xii. 1952 (all coll. *K. M. F. Scott*).

Cricotopus atriclava Kieffer

Trichocladius atriclava Kieffer, 1923, *Ann. Soc. ent. France* 92, 182.

This might well be an earlier description of *C. kisantuensis* Goetghebuer, but I have seen no type material and as no mention is made of shining bands it is not possible to be certain. The material described by Kieffer was in spirit, a medium which obscures pattern caused by polished or matt surfaces. Other main points of difference between the two species are the mention of pale halteres in the female (again possibly due to the preservation in spirit) and the figure of the male hypopygium. This is only roughly drawn perhaps from a poor mount, but suggests a resemblance to *rodriguensis*. Leg and body colour similar to *kisantuensis*, female cerci yellow.

Type series probably lost. Known only from the type locality, FRENCH CAMEROONS: Kribi.

Cricotopus harrisoni sp. n.

This species is very closely allied to *kisantuensis* and resembles it in colour in every respect except that there is a white ring on the middle as well as on the front tibia. Structurally the two species are similar except for the male hypopygium, the inner coxite lobes being quite different and the styles of *harrisoni* having an inner flange (Text-fig. 4, b).

Holotype male, KENYA, Aberdare Range, NYERI Track, 10,500–11,000 ft., 28.x.34 (*J. Ford*) in British Museum. Paratypes, TRANSVAAL: 2 ♂, Lydenburg District, Santa River, iv. 1955 (*A. D. Harrison*). NATAL: 1 ♀, Mooi River, nr. Rosetta, ix. 1953 (*A. D. Harrison*); 1 ♂, Mooi River, Keate's Drift, x. 1954 (*W. D. Oloff*).

Cricotopus rodriguensis Edwards

Cricotopus rodriguensis Edwards, 1923, *Ann. Mag. nat. Hist.* (9) 12, 332.

Resembles *kisantuensis* and *harrisoni* in appearance, but easily distinguished by the yellowish legs and black knees and by the pale halteres.

Male. Wing length 1.8 mm.

Head, antennae, mouthparts brownish black, face paler, A.R. 1.0. *Thorax* shining black, scutellum matt black. *Legs*: posterior two pairs yellow darkened at the knees and at the tips of the tibiae; front pair with femora yellow, broadly dark at the apex, tibiae dark with white ring as in *kisantuensis*, tarsi dark; white ring indicated but not conspicuous on middle tibiae; L.R. 0.6, small pulvilli just discernible. *Wings* similar to *kisantuensis*; halteres yellow. *Abdomen* black, with steely blue bands on segments 1-4 as in *kisantuensis*, segments 5, 6, 8 matt black, segment 7 mostly shining. Hypopygium (Text-fig. 4, c) with apical half of coxites and styles whitish, inner coxite lobe directed apically, style with sinuous inner margin and in the type two apical spines, a character which may not be constant.

Female similar to male, cerci yellow.

The original description was made from 3 ♂, and 11 ♀, all of which were cited as cotypes. There is one male and four females in the British Museum, I now select this male as lectotype and have marked it accordingly.

DISTRIBUTION: Known only from the type series: RODRIGUEZ I., viii-xi. 1918 (*Snell and Thomasset*).

Cricotopus albitibia Walker

Chironomus albitibia Walker, 1848, *List. Dipt. Brit. Mus.* 1, 16.

? *Trichocladus kribiensis* Kieffer, 1923, *Ann. Soc. ent. France* 92, 184.

Cricotopus bicinctus var. *plumbeus* Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* 25, 201 (SYN. NOV.)

Walker's type is a small male with almost entirely white tibiae to which darker apices can just be distinguished although the specimen is considerably faded. The female from Nigeria mentioned below certainly belongs here as do Goetghebuer's specimens. The South African specimens, however, are larger and darker with broader dark apices to the tibiae, but their general similarity is such that I have no hesitation in placing all in the same species. *T. kribiensis* is almost certainly a synonym, but as no mention is made of abdominal markings, possibly because the material was preserved in spirit, I am leaving the synonymy as a query.

Although this species shows considerable resemblance to the Palaearctic species *bicinctus* Meigen the male styles are broader, the coxite lobe more pointed and the shoulders darker. I think it is more satisfactory to treat it as a distinct species. It can be separated from other African species with black thorax and white tibial rings by the presence of leaden rings on segments 1 and 4 of the abdomen. It is best separated from *bizonatus* by the pale posterior tibiae.

Male. Wing length 1.3-2.8 mm.

Head and antennae black, A.R. 1.0. *Thorax* shining black, shoulders hardly paler, upper half of pleura brownish, scutellum slightly shining. *Legs*: trochanters yellow, femora black, extreme base paler; tibiae white, tips and bases narrowly

black, apical black band about twice as wide as basal one; anterior tibiae of S. African specimens with apical half or third black; anterior tarsi black, others browner; L.R. about 0.7; pulvilli probably absent. *Wings* with normal venation, costa slightly produced; halteres yellow. *Abdomen* black, segment 1, base of 2 and whole of 4 leaden yellow; hypopygium yellow, coxites with pointed inner lobe, styles rather stout (Text-fig. 4, *d*).

Female. Similar to male, but thorax often rather paler, so that the mesonotal stripes can just be distinguished; shoulders and upper parts of pleura yellowish, cerci white.

Holotype of *albitibia*, a male, in the British Museum; male cotypes of *plumbeus* in Musée Royal du Congo Belge; the type of *kribiensis* is probably lost (locality French Cameroons, Kribi).

DISTRIBUTION. SIERRA LEONE: 1 ♂ (type of *albitibia*). NIGERIA: 1 ♀, Minna, xii.1954 (*R. W. Crosskey*). ABYSSINIA: 1 ♀, Waldia, i.1936 (*J. W. S. Macfie*). UGANDA: 2 ♀, Jinja, x.1954 (*P. S. Corbet*). BELGIAN CONGO: Katana, Kivu (type series of *plumbeus*); 13 ♂, Goma, Kivu, xii.1952 (*J. Verbeke*). NATAL: 1 ♂, Estcourt, ix.1953 (*A. D. Harrison*). CAPE PROVINCE: series of both sexes, Berg River (*K. M. F. Scott*).

Cricotopus bizonatus sp. n.

Abdomen with segments 1 and 4 yellow, hypopygium white; shoulders yellow anterior tibiae with dark tip and base equal in length, posterior tibiae brown pulvilli absent, male styles narrower than in *albitibia* and coxite lobe blunt.

Male. Wing length 2.5 mm.

Head yellow, palpi rather darker, antennae brown, A.R. 1.0. *Thorax* shining, mesonotal stripes more or less fused and dark brown or black; shoulders, prothorax and upper parts of pleura yellow, remainder dark brown; scutellum dull. *Legs* with trochanters and bases of femora yellow, remainder of femora dark brown; anterior tibia with a centrally placed white ring about half as long as tibia, base and apex with equal blackish bands, anterior tarsi black; middle tibia with a white ring but basal dark band shorter than apical one, tarsi brown; posterior tibia brown and without white ring, apex rather darker, tarsi brown; pulvilli absent. *Wings* normal, anal lobe moderate, squama fringed. Halteres yellow. *Abdomen* very dark brown, the whole of segments 1 and 4 and the base of 2 yellow, hypopygium white, styles curved and of even width, inner coxite lobe blunt (Text-fig. 4, *e*).

Female resembles male; thoracic stripes rather more definitely separated.

Holotype male, NATAL: Weenen, vi.1925 (*H. P. Thomasset*) in British Museum. Paratypes, NATAL: 2 ♂, Mooi River, Keate's Drift, vii-viii.1954 (*W. D. Oliff*). TRANSVAAL: 1 ♀, Witpoortjie Falls, nr. Johannesburg, xi.1954 (*A. D. Harrison*).

Cricotopus flavozonatus Freeman

Cricotopus flavozonatus Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 131.

Distinguished from other African species by the presence of yellow bands on segments 1, 2, 4, and 5 of abdomen.

Male. Wing length 2.3-2.5 mm.

Head blackish, face pale, mouthparts black, antennae black, A.R. about 1.0. *Thorax* shining; mesonotum mainly blackish or pitchy, the stripes fused though they can just be distinguished by their slightly darker colour; prothorax, shoulders and mesonotal margins yellow; pleura, scutellum and postnotum black. *Legs* mainly brown, bases of all femora and anterior coxae yellow; anterior tibia with basal fifth blackish, followed by a pure white ring about one-third length of tibia, remainder dark brown; middle tibia similar, but not so clearly defined; posterior tibia with only a trace of a paler ring; all tarsi brown, L.R. about 0.7, pulvilli absent. *Wings* not distinctly milky, anal lobe obtuse, squama fringed, halteres whitish. *Abdomen* black with yellow basal bands on segments 1, 2, 4 and 5, claspers yellow; yellow bands progressively wider, those at base occupy little more than one-third of segment, that on fifth occupies nearly two-thirds. Hypopygium as in Text-fig. 4, *f*, coxite with small process, style with inner membranous extension.

Female resembles male but pale abdominal markings and leg rings may be less distinct, cerci yellow. Legs usually as in male but the paratype female has the markings obscured, although they can still be just distinguished.

Holotype male in British Museum.

DISTRIBUTION: UGANDA: 1 ♂, Ruwenzori Range, Kilembe, 4,500 ft., xii.34-i.35 (*F. W. Edwards*). NATAL: 1 ♂, Weenen, vi.1925 (*H. P. Thomassett*). CAPE PROVINCE: series of both sexes, including holotype and paratypes, from Berg Rivèr, iv-vi and x-xii 1952 and 1953 (*K. M. F. Scott*).

Cricotopus tricinctellus Goetghebuer

Cricotopus tricinctellus Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* 25, 201.

Distinguished from the preceding species by the yellow bands being on segments 1, 4 and 7, also the tibiae are white with dark tips only; similar to *verbekei* sp. n., but distinguished by white tibiae.

Goetghebuer described this species from two males. I have seen the only one of these that is left, in Musée Royal du Congo Belge and it is lacking the abdomen and four posterior legs. The following description is based partly on that specimen and partly on Goetghebuer's original description.

Male. Wing length 1.3 mm.

Antennal ratio 1.0. *Thorax* shining, dark brown, stripes just distinguishable (Goetghebuer says that the background is yellow.) *Legs* with femora yellow, browner apically, all tibiae white with only extreme apices blackish, tarsi brown, L.R. 0.7, small pulvilli present. *Wings* normal, costa slightly produced; halteres whitish. *Abdomen* black with segments 1, 4, 7 entirely yellow, hypopygium white, coxite without inner lobe.

Female not known.

Type locality, BELGIAN CONGO, Kisantu, iv.1931 (*de Wulf*).

Cricotopus sudanicus sp. n.

Thorax yellowish with dark brown separate stripes, abdomen brown with yellow bands on segments 1-4, all tibiae white with black tips, male hypopygium white,

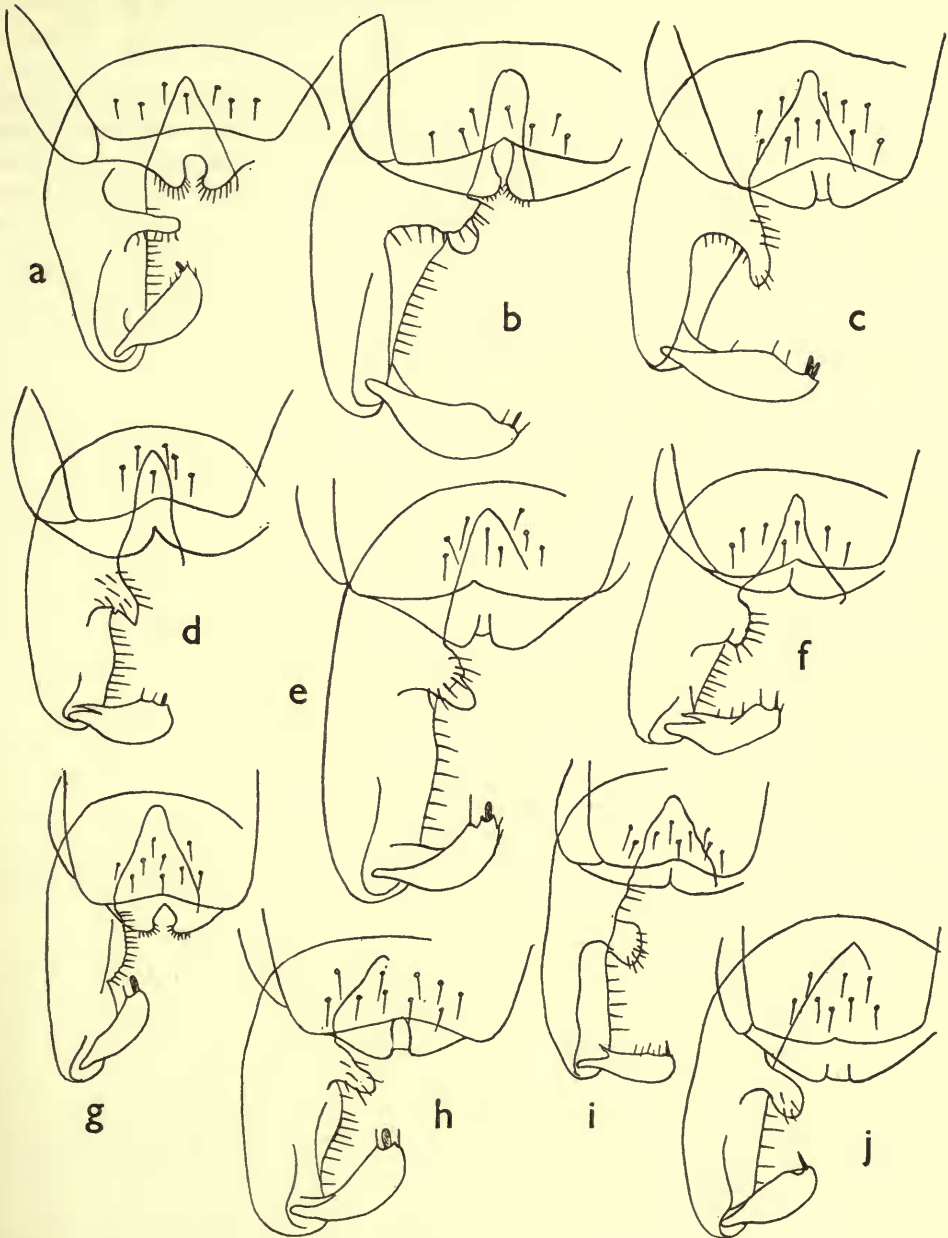


FIG. 4. Male hypopygia of *Cricotopus*. (a) *C. kisanuensis*; (b) *C. harrisoni*; (c) *C. rodriguensis*; (d) *C. albitibia*; (e) *C. bizonatus*; (f) *C. flavozonatus*; (g) *C. quadri-fasciatus*; (h) *C. obscurus*; (i) *C. bergensis*; (j) *C. dibalteatus*.

in structure very similar to *C. albitibia*. The description of *C. pictiventris* (see below) shows some similarity, but the posterior leg has the apical third dark and the thorax is uniformly brown black.

Male. Wing length 1.2 mm.

Head, mouthparts, antennae and plumes brown, A.R. about 0.9. *Thorax* yellowish brown and shining; stripes and postnotum dark brown, stripes separate, middle one not always very distinct. *Legs* with yellowish brown femora darkened towards the apex; tibiae white, tips only blackish; tarsi yellowish brown, pulvilli absent; L.R. 0.6. *Wings* with normal venation, anal angle right-angled; halteres yellow. *Abdomen* brown and yellow; segment 1 yellow; 2 and 3 yellow on basal half or two-thirds, brown apically; 4 entirely yellow, 5-9 brown, 8-9 darker than 5-7; hypopygium white, structure very similar to that of *albitibia* (Text-fig. 4, *d*) except that style narrower and apical spine thicker.

Female not known.

Holotype male, SUDAN, Wad Medani, ii. 1952 (*D. J. Lewis*) in British Museum. Paratypes, 3 ♂, same data as type; 1 ♂, Khartoum, iv. 1951 (*D. J. Lewis*), all in British Museum.

Cricotopus pictiventris Kieffer

Trichocladius pictiventris Kieffer, 1923, *Ann. Soc. ent. France* 92, 184.

I have seen no specimens of this species, which was described from three males. The following description is taken from the original.

Male. Length 2.5 mm.

Colour brown-black, thorax apparently uniformly black; trochanters and bases of femora whitish, anterior and middle tibiae pure white save for the extremities, posterior tibia white on basal third, posterior tarsi sometimes white, pulvilli short. Abdomen black and yellow; segment 1 largely yellow, posterior border black; segment 2 with anterior half yellow and posterior half black; 3 with anterior border yellow and posteriorly with a large black spot; 4 entirely yellow; 5-9 black; hypopygium pure white.

Holotype probably lost.

DISTRIBUTION: known only from the type series from FRENCH CAMEROONS, Kribi.

Cricotopus quadrifasciatus Kieffer

Trichocladius quadrifasciatus Kieffer, 1911, *Trans. Linn. Soc. Lond.* (2) *Zool.* 14, 360.

Brown and yellow, scutal stripes separate, anterior tibiae entirely white, abdomen yellow with brown bands on segments 2, 3, 5 and 8, anal area of wings reduced.

Male. Wing length 1.25 mm.

Head, antennae and mouthparts brownish yellow, A.R. about 1.0. *Thorax* shining yellowish brown with darker brown stripes, postnotum and sometimes sternopleuron; stripes separate. *Legs* yellowish brown, anterior tibiae completely white, middle tibiae white, narrowly brown basally, more broadly so at apex, posterior tibiae yellowish brown; L.R. 0.65. *Wings* unmarked, anal area reduced, almost

cuneiform, venation normal, halteres yellow. *Abdomen* mainly yellow and with brown bands occupying posterior halves of segments 2-3, most of 5 and 8; segment 6 sometimes with a dark apical band. Hypopygium white, inner coxite lobe reduced (Text-fig. 4, *g*).

Female. Very similar to male, abdomen with larger brown bands, cerci yellow.

Type series in the British Museum.

DISTRIBUTION: Known only from the type series, SEYCHELLES: Mahé.

Cricotopus meilloni sp. n.

Distinguished from *C. 4-fasciatus* by the absence of white markings on the middle tibiae, by the presence of a dark tip to the anterior tibia and by the better developed anal area to the wing. Distinguished from *C. sudanicus* by the yellow markings on segments 7-8 and by the absence of white markings on the middle tibiae.

Male. Wing length 1.3 mm.

Head, antennae and mouthparts brown, A.R. about 1.0. *Thorax* yellowish with brown separate scutal stripes; postnotum brown. *Legs* yellowish brown except for anterior tibiae which are white with apical quarter darkened; small pulvilli probably present, anterior tarsi missing in the type. *Wings* with a distinct brownish tinge, venation normal, anal area larger than in *4-fasciatus*, halteres whitish. *Abdomen* yellow with brown bands; segments 2-3 brown on apical halves, 5 entirely brown, 6 brown apically, 8 entirely brown, remainder and hypopygium yellow. Hypopygium with coxite lobe rather like that of *albitibia* (Text-fig. 4, *d*) but style narrower and longer.

Female not known.

Holotype male, TRANSVAAL: Tzaneen, ii. 1932 (*B. de Meillon*) in British Museum.

Cricotopus obscurus Freeman

Cricotopus obscurus Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 131.

A dark species without abdominal or leg markings, separable from the following species by the structure of the male hypopygium and by the larger size.

Male. Wing length 2.0 mm.

Head black, mouthparts, antennae and plumes black, A.R. about 1.0. *Thorax* shining but not brilliant, stripes black on a brown or yellowish background, shoulders and lateral margins more yellowish; pleura yellowish above, black below; scutellum brown, postnotum black. *Legs* uniformly pale brown, L.R. 0.6, pulvilli absent. *Wings* slightly milky, costa hardly produced, anal lobe right-angled. Halteres with dark stems and brownish knobs. *Abdomen* uniformly blackish; hypopygium black, coxite with inner thumb-like process (Text-fig. 4, *h*), style without inner flange.

Female very similar to male in colouring, femora slightly darker than the rest of the legs.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: Berg River, series of both sexes from Wellington (type locality), Ceres, Hermanus Falls, French Hoek (*K. M. F. Scott*). NATAL: Tugela and Mooi Rivers, series of both sexes, ix. 1953 (*A. D. Harrison*).

Cricotopus bergensis Freeman

Cricotopus angustus Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) **22**, 132 *nec* Goetghebuer, 1927, *Ann. Bull. Soc. ent. Belge* **67**, 52.

Cricotopus bergensis Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) **23**, 173, *nom. nov. pro. angustus*.

Very similar to *obscurus* but rather smaller and differing in the male hypopygium.

Male. Wing length 1.4 mm.

Head yellowish brown, mouthparts black, A.R. about 1.0. *Thorax* with three dark brown stripes on a yellowish ground colour, scutellum yellowish, postnotum and sternopleuron dark brown; whole thorax slightly pruinose, not so markedly yellow as in *obscurus*. *Legs* brown, L.R. about 0.6, pulvilli absent. *Wings* similar to *obscurus*, anal lobe perhaps more obtuse. Halteres rather paler. *Abdomen* uniformly blackish; hypopygium (Text-fig. 4, *i*) with narrow coxite with well developed inner process of a different shape from that of *obscurus*, style broader and lacking inner flange.

Female resembles male, cerci dark.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: type series of 2 ♂, Berg River, Piquetberg, x-xi.52 (*K. M. F. Scott*). NATAL: 1 ♂, 3 ♀, Natal National Park v.1954 (*W. D. Oliff*). ABYSSINIA: 3 ♂, 1 ♀, Waldia, i.1936 (*J. W. S. Macfie*).

Cricotopus scottae sp. n.

Indistinguishable in colour from *obscurus*. Structurally differs in the male hypopygium which is almost as in *quadrifasciatus* (Text-fig. 4, *g*), the inner coxite lobe being obtuse, also the costa is distinctly produced.

Holotype male, CAPE PROVINCE, Berg River, Wellington, 28.iv.51 (*K. M. F. Scott*) in British Museum. Paratypes—CAPE PROVINCE; 1 ♂, Piquetberg, 25.ix.52 (*K. M. F. Scott*). NATAL: 1 ♂, Tugela River, Oliviershoek Bridge, viii.1954 (*A. D. Harrison*). TRANSVAAL: 7 ♂, 2 ♀, Johannesburg, Olifantsvlei, v-viii.1954 and 1 ♂, III 1955 and 4 ♂, 2 ♀, Gt. Usutu River, nr. Amsterdam, ix.1954 (*A. D. Harrison*). S. RHODESIA: 4 ♂, Salisbury, ix-x.1954 (*E. T. M. Reid*). BELGIAN CONGO: 16 ♂, 12 ♀, Vitshumbi (S. Lake Edward) i.1953 (*J. Verbeke*).

Cricotopus dibalteatus sp. n.

Tibiae without white markings, thoracic stripes separate, abdomen with two leaden yellow bands, one occupying the whole of segments 1 and 2, the other on 5, hypopygium pale, coxite lobe well developed.

Male. Wing length 1.25 mm.

Head brown, mouthparts and antennae darker, A.R. 0.6. *Thorax* with brownish yellow background, scutal stripes blackish, shining and separate, middle one divided longitudinally; scutellum matt black, postnotum and sternopleuron dark brown. *Legs* uniformly yellowish brown, pulvilli absent, L.R. 0.75. *Wings* with a distinct brownish tinge, venation normal, costa hardly produced, anal area moderate,

halteres yellow. *Abdomen* blackish, segments 1, 2, 5 completely leaden yellow, incisures and hypopygium paler. Hypopygium (Text-fig. 4, *j*) with well formed and slightly capitate coxite lobe, style normal, apical spine fairly long.

Female resembles male, cerci pale.

Holotype male and 1 ♂, 1 ♀ paratypes, CAPE PROVINCE: Platteklip Gorge, 27.i.53 (*K. M. F. Scott*) all in British Museum. *Transvaal*: 1 ♂, Lydenburg Dist., iv.1955 (*A. D. Harrison*).

A second male from Transvaal has distinct white rings on the anterior tibiae which may be the normal condition, those with the plain tibiae being teneral.

Cricotopus verbekei sp. n.

Legs without white rings; thoracic stripes brown, more or less separated, abdomen with segments 1, 4 and 7 yellow.

At first sight this species appears to resemble *tricinellus* but it is easily distinguished by the absence of white rings on the tibiae.

Male. Wing length 1.2-3 mm.

Head yellowish brown, palpi darker, antennae dark brown, A.R. 0.9, eyes densely pubescent. *Thorax* brown or dark brown, shining; shoulders, wing-bases, pleural membrane and prothorax yellowish; mesonotal stripes more or less separated by yellow. *Legs* uniformly brown, L.R. 0.7, pulvilli absent, empodium well developed. *Wings* with anal lobe right-angled, costa slightly produced, venation normal, halteres yellow. *Abdomen* dark brown, segments 1, base of 2, 4, 7 and hypopygium yellow; incisure between 2 and 3 also pale. Hypopygium simple, coxite without inner lobe, style with no flange, anal point absent as usual.

Female very similar to male; thorax more yellow, stripes well separated, cerci yellow.

Holotype male and paratypes 2 ♂, BELGIAN CONGO: Mbereze, Baie Pili-Pili ii.1953 (*J. Verbeke*) in Institut Royal des Sciences Naturelles de Belgique. Paratypes in British Museum, SUDAN: 10 ♂, 12 ♀, Wau, x.1952 and 1 ♀, Amadi, vi-vii.1954 (*E. T. M. Reid*). NIGERIA: 2 ♀, Alzaga, i.1955 (*R. W. Crosskey*).

Genus *TRICHOCLADIUS* Kieffer

Trichocladius Kieffer, 1906, *Mem. Soc. Sci. Brux.* **30**, 356; ? Kieffer, 1923, *Ann. Soc. ent. France* **92**, 182 (in part); Edwards, 1929, *Trans. ent. Soc. Lond.* **77**, 328 (as subgenus of *Spaniotoma*). *Dactylocladius* Kieffer, 1918, *Ann. Mus. nat. Hung.* **16**, 81 (in part) (not Kieffer, 1906, *Mem. Soc. Sci. Brux.* **30**, 356).

Cricotopus Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* **25**, 200 (in part).

Eukiefferiella Goetghebuer, 1934, *Ibid.* **25**, 204 (not Thienemann, 1926, *Arch. Hydrobiol.* **17**, 325).

Eyes pubescent; scutum usually shining, dorso-central bristles large and erect, humeral pits unusually large in most species; wing membrane without macrotrichia or distinguishable microtrichia, squama with complete fringe, R_{2+3} ending near mid-way between R_1 and R_{4+5} .

I am following Edwards (1929) in his use of the name *Trichocladius* for the hairy-eyed species with erect dorso-central bristles and large humeral pits. However, I

prefer to consider the group of generic rather than subgeneric level, as explained in the introduction to the subfamily.

As mentioned under *Cricotopus*, four of the African species described by Kieffer in *Trichocladius* seem to belong to *Cricotopus* as used here. Two only, *T. albiclava* Kieffer 1923, and *guineensis* Kieffer 1918, may not be *Cricotopus*. The true genus of *albiclava* is in some doubt because Kieffer omits mention of the pubescent eyes, though he mentions this character for all other species; it is probably neither *Cricotopus* nor *Trichocladius*. *T. guineensis* was described from a female and is unrecognizable; the type is lost. Brief diagnoses from the original descriptions are given below.

Three species described by Goetghebuer in 1934, two in *Cricotopus* and one in *Eukiefferiella* should be placed in *Trichocladius*.

KEY TO AFRICAN SPECIES OF *Trichocladius*

(*T. albiclava* and *guineensis* not included)

1. Pulvilli absent, anal point absent, humeral pits small or not distinct 2
 Pulvilli present, anal point present, humeral pits large and distinct 3
2. Prothorax with brilliant silvery pruinosity in both sexes, mesonotal stripes fused
 in male *micans* Kieffer
 Prothorax without silvery pruinosity, mesonotal stripes separate in male (female not
 known) *pretorianus* sp. n.
3. Segment 1 and often 6-8 of male abdomen yellow, female unknown
 *cereofasciatus* Goetghebuer
 Abdomen entirely black, at least dorsally 4
4. Small species, wing length 1.0 mm.; thorax with strong bluish metallic sheen; costa
 distinctly produced *metallescens* Goetghebuer
 Larger species, wing length 1.7-2.0 mm.; thorax shining but metallic sheen either ab-
 sent or only present when viewed from certain angles and then slight; costa hardly
 produced *capensis* Freeman

***Trichocladius micans* Kieffer**

Dactylocladius micans Kieffer, 1918, *Ann. Mus. nat. Hung.* **16**, 81.

Cricotopus dewulfi Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* **25**, 201 (SYN. NOV.).

Trichocladius micans Freeman, 1955, *South African Animal Life*. Uppsala. **2**, 251.

Although the absence of pulvilli and anal point place this species in Edwards' Group A, the humeral pits are larger than usual though not as large as those of *capensis*. It is easily separated from the other African species by the strikingly silvery prothorax in both sexes, a character not mentioned by either Kieffer or Goetghebuer.

Male. Wing length 1.5-1.8 mm.

Head, mouthparts and antennae dark, eyes pubescent, A.R. about 1.0. *Thorax* shining black, stripes fused, shoulders yellowish, prothorax yellowish and with distinctive silvery pruinosity, humeral pits not as large as in *capensis*, but larger than is usual in the subfamily; dorso-central hairs well developed. *Legs*: femora with basal half yellowish and apical half dark, anterior tibiae and tarsi black, other tibiae brownish, tarsi blackish, L.R. 0.6; pulvilli absent, empodium well developed.

Wings with anal lobe slightly produced, halteres yellow. Abdomen black and with black hairs. Hypopygium (Text-fig. 5, a) without anal point, otherwise very similar to *capensis*, styles sometimes yellow.

Female, similar to male, antennae with 7 segments, thorax with stripes more or less fused, prothorax silvery, humeral pits smaller than in *capensis*, cerci may be yellow.

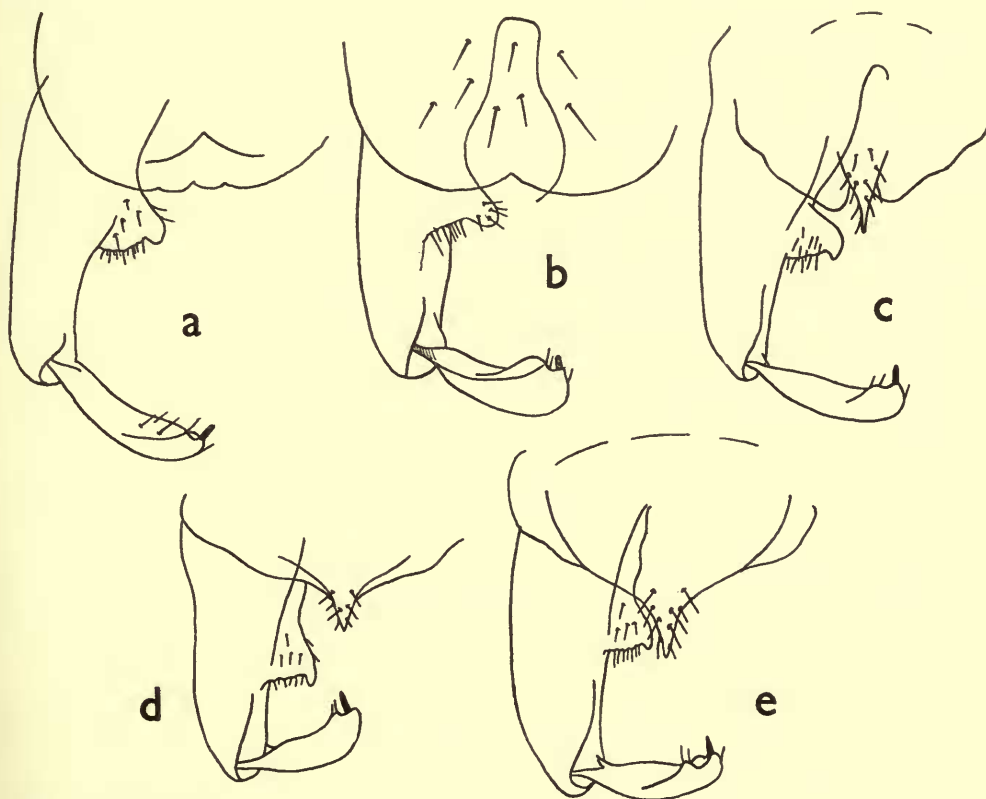


FIG. 5. Male hypopygia of *Trichocladius*. (a) *T. micans*; (b) *T. pretorianus*; (c) *T. capensis*; (d) *T. metallescens*; (e) *T. cereofasciatus*.

I have seen a cotype male, borrowed from the Hungarian National Museum, also the type series of *Cricotopus dewulfi* in Musée Royal du Congo Belge.

DISTRIBUTION. CAPE PROVINCE: 1 ♂, Port St. John, v.1924 (*R. E. Turner*); 1 ♂, 1 ♀, Outshorn, x.1931 (*A. Mackie*); 2 ♂, 2 ♀, Hout Bay, ii.1951 (*P. Brinck*). NATAL: 27 ♂, 10 ♀, Tugela River, Mooi River, Bushman's River, ix.1953 (*A. D. Harrison*); 1 ♂ cotype, New Hanover; 4 ♂, 3 ♀, Weenen, xii.23, iv-v.24, vi.25 (*H. P. Thomasset*). TRANSVAAL: 1 ♂ cotype, Pretoria; 2 ♂, Pretoria, 1954 (*G. Rudebeck*); 2 ♂, 1 ♀, Nelspruit, x.1954 (*A. D. Harrison*). BELGIAN CONGO: type series of *dewulfi*, Kisantu, iv.1931 (*de Wulf*). UGANDA: 3 ♀, L. Victoria (*W. W.*

Macdonald). ABYSSINIA: 1 ♂, 1 ♀, Dessie, xii.35-i.36 (*J. W. S. Macfie*). YEMEN: 2 ♂, San'a, 7,900 ft., ix.37-i.38 (*C. Rathjens*).

***Trichocladius pretorianus* sp. n.**

Mesonotal stripes black, clearly separated, background yellow; humeral pits not very distinct, prothorax not silvery; pulvilli absent; anal point absent. It falls into Edwards' Group A.

Male. Wing length 1.8 mm.

Head, mouthparts and antennae blackish brown, face pale; eyes densely pubescent; A.R. about 1.2. *Thorax* mainly black but with yellow background colour on shoulders, along lines of dorso-central bristles, along lateral margins of mesonotum and upper parts of pleura; stripes clearly separated, middle one extending back to scutellum. Dorso-central bristles erect and their pits clear, humeral pits not very distinct, prothorax not silvery. *Legs* brown, trochanters yellow, L.R. 0.6, pulvilli absent, empodium well developed. *Wings* with normal venation, costa not produced, anal lobe slightly produced, halteres yellow. *Abdomen* black. Hypopygium (Text-fig. 5, *b*) without anal point, coxite with inner lobe, style with strongly developed flange.

Female not known.

Holotype male, TRANSVAAL: Pretoria, 16.vi.54 (*A. D. Harrison*), in the British Museum.

? ***Trichocladius albiclava* Kieffer**

Trichocladius albiclava Kieffer, 1923, *Ann. Soc. ent. France* 92, 183.

As explained above, this species is placed here in some doubt. The type is lost and the characters given by Kieffer are not sufficient for placing it accurately in a genus. No mention is made of the hairiness or otherwise of the eyes.

Male. Length 2.3 mm.

Brown black, palpi whitish, very long. Antennae brown, segments 5-13 twice as long as broad, A.R. 1.5. Halteres white, wings finely punctate, veins brownish, costa produced for a distance equal to length of r-m; R_{4+5} ending basal to level of apex of M_{3+4} , posterior fork below r-m which is perpendicular. Legs brown, trochanters white, L.R. 0.6, pulvilli absent, empodium as long as claws. Abdomen brownish white, last three segments and hypopygium brown. Judging by Kieffer's figure, hypopygium not unlike *Cricotopus obscurus* (Text-fig. 4, *h*).

Female not known.

Type locality FRENCH CAMEROONS: Kribi.

? ***Trichocladius guineensis* Kieffer**

Trichocladius guineensis Kieffer, 1918, *Ann. Mus. nat. Hung.* 16, 84.

This species was described in a paper devoted to the Chironomidae of the Hungarian National Museum, but the type which is lost did not belong to that Museum, having been sent to Kieffer separately by Professor Silvestri.

Female. Length 1.5 mm.

Brown black, ventrally brownish yellow; palpi brownish; eyes oval, pubescent; antennae broken; wings punctate, veins brown, costa hardly produced, posterior fork well distal to r-m cross-vein; anterior tarsi broken, empodium equal to the claws.

Type locality, FRENCH GUINEA: Mamon.

Trichocladius capensis Freeman

Trichocladius capensis Freeman, 1953, *Proc. R. ent. Soc. Lond.* **22**, 133.

This is a very typical species of the genus falling into Edwards' (1929) Group B. As stated in the original description there is some variation in colour.

Thorax strongly shining, stripes black, more or less fused in the male, may be separated in the female; humeral pits very large; halteres brown; pulvilli present.

Male. Wing length 1.75-2.0 mm.

Head black, mouthparts black, antennae and plumes black, pedicel pruinose, A.R. about 1.0. *Thorax* brightly shining with three prominent black stripes which are usually more or less fused, the intervening areas being brown rather than black; humeral pits large and dorso-central bristles well developed, shoulders may be yellow; scutellum brownish, postnotum black, pleura yellowish, sternopleura black. *Legs* brown, paler at bases of femora, darker on tarsi and at knees, pulvilli well developed, L.R. 0.75. *Wings* unmarked, costa hardly produced, anal lobe not produced, right-angled, squama fringed, halteres with brownish knobs. *Abdomen* black, basal segments sometimes tinged with brown, especially laterally. Hypopygium (Text-fig. 5, c) with well developed hairy anal point.

Female. Resembles male in general features, face paler, antennae with 6 segments, ground colour of thorax often yellow and the stripes well separated, but this is not universal and some specimens have stripes more or less fused; cerci black.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype and type series of both sexes from Berg River iv-v and xii. 1952, other specimens, vii, x and xi (*K. M. F. Scott*). NATAL: 1 ♀, Scottburgh, vii. 53 (*A. D. Harrison*); 1 ♂, 1 ♀, Estcourt, iv. 54 (*W. D. Oliff*). TRANSVAAL: 1 ♀, Nelspruit, ix. 54 (*A. D. Harrison*); 1 ♂, Blyde River, ix. 1954 (*A. D. Harrison*). TANGANYIKA: 1 ♂, Amani, iii. 1955 (*M. T. Gillies*).

Trichocladius metallescens Goetghebuer

Eukiefferiella metallescens Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* **25**, 204.

Goetghebuer seems to have missed the pubescent eyes when he placed this species in *Eukiefferiella*. It is extremely similar to the Palaearctic species *T. chalybeata* Edwards, from which it may be separated by the smaller humeral pits and lower antennal ratio. The male is a small black insect with a strong bluish metallic sheen on the mesonotum. In the female there is more yellow on the thorax and the stripes are partially separated.

Male. Wing length 1.0 mm.

Head brownish black, face yellowish brown, antennae and mouthparts brown, A.R. 0.8, eyes closely covered with short pubescence. *Thorax* entirely black, meso-

notum with a brilliant steely blue sheen, scutellum matt; humeral pits very distinct, circular and white, but smaller than in *chalybeata*. *Legs* dark brown, L.R. 0.6, small pulvilli present. *Wings* clear, anterior veins brown, posterior ones pale, costa distinctly produced, R_{2+3} normal, anal angle almost a right angle, squama fringed; halteres dark. *Abdomen* black, sternites paler, hypopygium (Text-fig. 5, *d*) not unlike that of *capensis*, but coxite lobe nearer the apex, anal point shorter and broader, style rather more curved.

Female quite similar to male but thorax partially yellow; pleura yellowish, shoulders slightly yellow, stripes partially separate.

I have seen the type series in the Musée Royal du Congo Belge.

DISTRIBUTION. BELGIAN CONGO: type series of 5 ♂, Kisantu, iv. 1932 (*de Wulf*); 1 ♂, Elisabethville iii. 1939 (*H. J. Brédo*). SIERRA LEONE: 2 ♀, River Njia, i. 1926 (*B. Blacklock*). SUDAN: 1 ♂, Amadi, vi-vii. 54 (*E. T. M. Reid*).

Trichocladius cereofasciatus Goetghebeur

Cricotopus cereofasciatus Goetghebeur, 1934, *Rev. Zool. Bot. Afr.* 25, 202.

Structurally very similar to *capensis*, but readily separated by the yellow abdominal bands on segments 1 and 8 or 6-8.

Male. Wing length 1.75 mm.

Head yellowish brown, face paler, antennae and palpi brown, A.R. 1.2, eyes densely pubescent. *Thorax*: mesonotal background yellow, stripes shining, blackish brown and fused or separate, shoulders yellow or orange with large humeral pits, dorso-central bristles clear; pleura yellow, sternopleuron brown, scutellum matt black, postnotum black. Goetghebeur states that the dorso-central bristles are not erect, but this is incorrect, because they are distinct and erect in both type specimens. *Legs* brown, coxae and trochanters yellowish, L.R. 0.8 (stated by Goetghebeur to be 1.1), pulvilli present. *Wings* with a slight brownish tinge, anal angle obtuse, squama fringed; halteres yellow. *Abdomen* black, segments 1 and 6-8 rich yellow in type specimens and Rutshuru specimen; Elisabethville males have 6-7 dark; hypopygium black (Text-fig. 5, *e*), very similar to *capensis*.

Female not known.

I have seen the type series of two males in the Musée Royal du Congo Belge.

DISTRIBUTION. BELGIAN CONGO: type series of 2 ♂, Kisantu, iii-iv. 31 (*de Wulf*); 1 ♂, Rutshuru, i. 1934 (*de Wulf*); 2 ♂, Elisabethville, ii-iv. 1939 (*H. J. Brédo*).

Genus *HARRISONINA* gen. nov.

Eyes oval, densely pubescent, facets rounded. Antennae short, reduced and without plumes in the male, five-segmented in the female, six-segmented in the male. Male palpi well developed and with four segments, in female short and segmentation obscured. Prothorax collar-like and undivided, anepisternal suture distinct, postnotum rounded and without longitudinal fissure. Wings without macrotrichia, membrane coarsely punctate but microtrichia indistinct, especially in the male, squama bare, wing fringe short; R_{2+3} simple and well developed, costa produced,

r-m cross-vein long and nearly transverse. Legs rather long, posterior pair the shortest and thickened and with modified basitarsus in the male of the only known species; pulvilli practically absent, empodium well developed; tibial spurs present on front and posterior tibiae, absent from middle tibiae; posterior tibial comb reduced and represented by a patch of bristles. Eighth abdominal segment of female more strongly sclerotized than others, sternite with two short downward projections at apex; spermathecae three in number, sclerotized and bell-shaped. Male hypopygium of the only known species not inverted, style subapical and with peg-like teeth along it which close inwardly on to a spiny area of the coxite.

Type of the genus *Harrisonina petricola* sp. n.

In general appearance and in such characters as the reduction of the posterior tibial comb, postnotal fissure and male antennae, the only known species of this genus shows some resemblance to species of the subfamily Clunioninae. However, it obviously does not belong there because of the well developed prothorax and anepisternal suture. Although it falls into the subfamily Orthoclaudiinae on account of the absence of the base of M_4 and by the short anterior basitarsus, its exact affinities are obscure.

The distinctive features separating it from other genera, especially *Abiskomyia* Edwards, are the pubescent eyes, reduced male antennae, absence of mid-tibial spurs, reduction of posterior tibial comb, absence of postnotal fissure, the peculiar male hypopygium and the presence of three bell-shaped spermathecae.

As mentioned in Part I, three spermathecae are present in species of the subfamily Tanypodinae and in *Protanypus* of the Diamesinae, a genus which is intermediate between the two subfamilies. In other genera and subfamilies which I have examined, there are only two spermathecae and it is therefore surprising to find three here.

Harrisonina petricola sp. n.

A small uniformly brown fly with greyish wings; eyes pubescent, male antennae simple and six-segmented; dorso-central bristles visible, but not large; postnotum without fissure; abdomen clothed with short spine-like hairs; male posterior basitarsus short and thick; male styles subapical and with 6-8 capitate spines in a row.

Male. Wing length 1.5 mm.

General coloration dark brown, the stalks of the halteres are pale, but the knobs are dark. *Head*: eyes densely pubescent, palpi four-segmented, the second segment long (Text-fig. 6, *a*), palpifer well formed and may be mistaken for a fifth segment; antennae (Text-fig. 6, *c*) greatly reduced, six-segmented, with short hair only. *Thorax*: prothorax hairy, complete and collar-like, though narrower in the centre, slightly overhung by the mesonotum; dorso-central hairs present but short, acrostichals seem to be absent, postnotum without fissure, though a central faint line, can be seen on a cleared specimen. *Legs* rather long but, unlike the Clunioninae, it is the middle pair which are the longest and their tibiae lack apical spurs; pulvilli only distinguishable in slide mounts, empodium well developed, L.R. 0.7. Posterior legs thickened and short, tibiae with two spurs, comb represented by a group of about

eight bristles, basitarsus short and thickened (Text-fig. 6, *f*), ending obliquely and with a short thick spine each side, the second segment is inserted between the spines and in the middle of the oblique end, second segment subequal to basitarsus. *Wings* (Text-fig. 6, *e*) with anal area cut away to some extent; costa produced, R_{2+3} simple, r-m long and transverse, squama bare. *Abdomen*, especially segments 1-5 clothed with short spine-like setae similar to those of female but much fewer in number. Hypopygium (Text-fig. 6, *g*) quite peculiar; anal point well developed, stout and blunt; coxites rounded apically, styles set subapically on coxites and with 6-8 capitate spines in a row closing on to a spiny area on the inner surface of the coxite.

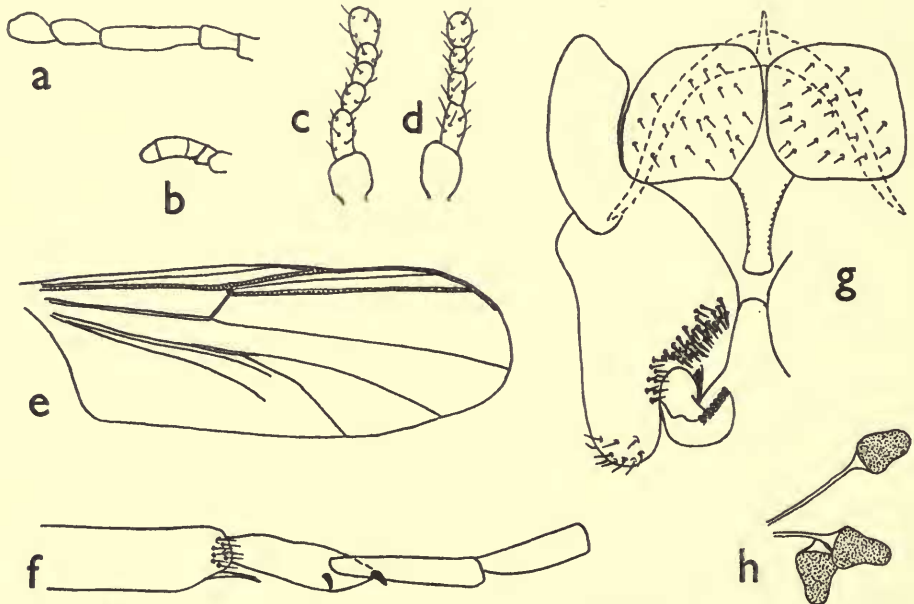


FIG. 6. *Harrisonina petricola*. (a) Male palp; (b) female palp; (c) male antenna; (d) female antenna; (e) male wing; (f) apex of posterior tibia and base of tarsus of male; (g) male hypopygium; (h) spermathecae.

Female. In size and general appearance similar to male. Antennae only 5-segmented (Text-fig. 6, *d*), hairs short, palpi (Text-fig. 6, *b*) shorter than in male and segmentation indistinct. Posterior legs unmodified, but still the shortest, basitarsus cylindrical and twice as long as second segment. Abdomen thickly clothed on segments 1-7 with short, curved, spine-like setae. Spermathecae (Text-fig. 6, *h*) three in number, and with a slight constriction making them bell-shaped, each has its own duct.

Holotype male and one male and two female paratypes TRANSVAAL: Olifants River Valley, 17.xi.54 (*A. D. Harrison*). Mr. Harrison found this species breeding in the thin film of water running over the stones in a temporary mountain stream. Holotype and one paratype in British Museum, other two paratypes in S. African Museum.

Genus *CARDIOCLADIUS* Kieffer

Cardiocladius Kieffer, 1912, *Spolia zeylanica* 8, 22, Edwards, 1924, *Ent. mon. Mag.* 60, 203-7; Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 317.

Eyes bare. Pronotum wide and collar-like, with a median V-shaped emargination. Fourth tarsal segment distinctly cordiform and much shorter than the fifth, empodium small, pulvilli absent, tibial spurs and comb normal. Wings bare, both macrotrichia and microtrichia being absent; anal lobe well developed, squama fringed; R_{2+3} faint at apex and not distinctly reaching costa, well separated from R_1 ; posterior fork slightly beyond r-m. Ninth tergite of female with a finger-like projection on each side; anal point of male absent, except in the S. American species *C. acuminatus* Edwards.

Most of the species of this genus have heavily dusted thoraces; in the S. American species mentioned above the thorax is shining. Thienemann (1954, *Die Binnengewässer* 20, 49 and 58) states that the larvae of *Cardiocladius* species live amongst colonies of *Simulium* larvae and pupae on which they feed. All the breeding records known to me are from rivers and streams. No species have been described from Africa by either Kieffer or Goetghebuer.

KEY TO AFRICAN SPECIES OF *Cardiocladius*

- | | |
|---|--------------------------|
| 1. Dorso-central bristles uniserial | 2 |
| Dorso-central bristles bi- or triserial | 3 |
| 2. Legs pale, posterior femora in most specimens yellow with dark tips, male styles incurved (Text-fig. 7, a) | <i>africanus</i> Freeman |
| Legs dark, pale only at the base, male styles broader (Text-fig. 7, b) | <i>oliffi</i> sp. n. |
| 3. Thoracic stripes of male separate, background yellow, yellowish brown species (female not known) | <i>hessei</i> sp. n. |
| Stripes of male and female indistinct, background grey, blackish species with grey rings on abdomen | <i>latistilus</i> sp. n. |

Cardiocladius africanus Freeman

Cardiocladius africanus Freeman, 1955, *South African Animal Life*. Uppsala, 2, 249.

Thorax uniformly dusted with grey, abdomen black, legs mainly yellow except for anterior pair, male styles somewhat incurved at apex. This appears to be the most widespread and common species.

Male. Wing length 2.0 mm.

Head dark grey, face yellowish, palpi dark, antennal plumes white, A.R. about 1.3. *Thorax* with black cuticle, shoulders slightly paler, the whole thorax uniformly and heavily grey dusted, except on scutellum and postnotum, mesonotum with a fine median black line; acrostichal bristles absent, dorso-centrals white and uniserial, quite long and present only on posterior two-thirds of mesonotum. *Legs*: anterior pair dark except for basal half of femur which is pale, other legs pale with dark knees, tips of tibiae and tarsal segments; some South African specimens have the posterior four femora mostly dark. *Wings* clear, anal lobe moderate, squama with complete fringe, venation normal, costa not produced; halteres yellow. *Abdomen*

black with white hairs. Hypopygium (Text-fig. 7, *a*) lacking anal point; style rather incurved and with a single spine, not flattened; coxite lobes more or less double, one part conical, the other slightly hooked.

Female. Quite similar to male, but shoulders often more definitely pale, sometimes quite yellow and paleness may extend back along lines of bristles so that stripes are separate, although grey dusting obscures the pattern; prothorax and scutellum yellowish; abdominal segments paler at apices; IXth tergite with lateral processes as usual.

Holotype male in British Museum.

DISTRIBUTION. ETHIOPIA: 1 ♂, 15 ♀, Waldia, i. 1936 (*J. W. S. Macfie*)—type series. BELGIAN CONGO: Elisabethville, 3 ♀, ii. 1934, 3 ♂, xii. 38–ii. 39, 2 ♀, ii. 1940 (*J. H. Brédo*); 1 ♀, Bambesa, 1937 (*J. Vrydagh*). NATAL: 1 ♀, Estcourt, ii. 1951, 1 ♂, Royal Natal National Park, iv. 1951, 1 ♀, Albert Falls, Umgeni River, iv. 1951 (*Swedish S. African Exp.*).

Cardiocladius oliffi sp. n.

Very similar in general appearance to *C. africanus*, from which it may be separated by the structure of the male hypopygium, by the darker legs and by the shorter antennae.

Male. Wing length 2 mm.

Head dark grey, palpi blackish, antennal plumes whitish, antennae rather short, A.R. about 1.0. *Thorax* blackish, shoulders slightly paler, heavily dusted with grey, dorso-central bristles uniserial, only present on posterior two thirds. *Legs* mainly blackish brown, femora paler at the base, tibiae slightly paler except at tips; L.R. 0.6. *Wings* as in *africanus*, halteres pale. *Abdomen* black with mixed dark and pale hair; hypopygium (Text-fig. 7, *b*) with coxite lobe more like *latisilus* than *africanus* but larger, style broad but not as broad as in *latisilus*, margins sinuous, not incurved at apex, anal point absent.

Female not known.

Holotype male, NATAL: Natal National Park, 13.iv.54 (*W. D. Oliff*), in the British Museum.

Cardiocladius latisilus sp. n.

Thorax black, uniformly and heavily grey dusted, femora with dark markings, abdomen with pruinose rings at apices of segments. Distinguished from *C. africanus* and *oliffi* by the triserial dorso-central bristles and from all species by the very broad male styles.

Male. Wing length 2.5–2.75 mm.

Head brown, face yellowish, palpi dark, antennae dark, rather short, A.R. 1.0, plumes whitish. *Thorax* black, heavily grey dusted, stripes just distinguishable, prothorax and pleural membrane paler, prescutellar area brown tinged; acrostichal bristles absent, dorso-centrals irregularly triserial, short and white, pits very distinct, absent from anterior third of mesonotum. *Legs* yellow and brown; anterior legs with yellow coxae, trochanters and basal half of femora, remainder blackish brown,

L.R. 0.75; middle and posterior femora yellow with a broad brown median band, knees, tips of tibiae and tarsi blackish, remainder of tibiae and basal half of basitarsi yellowish. *Wings* as in *africanus*, halteres whitish. *Abdomen* black with pale hair, each segment with an apical grey pruinose ring occupying a quarter or one-third.

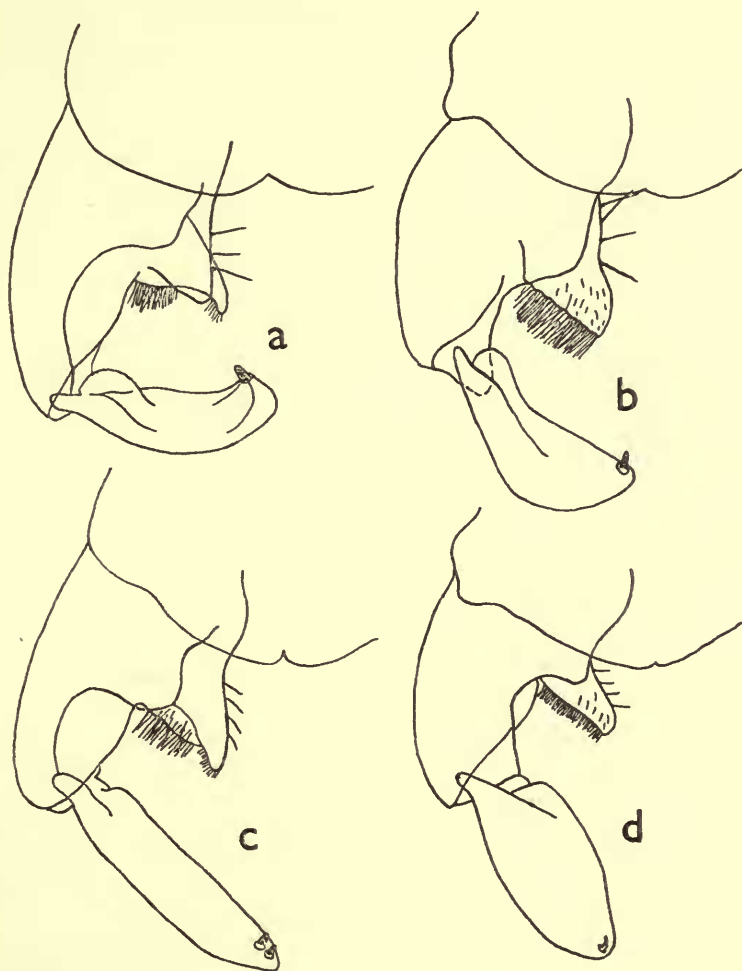


FIG. 7. Male hypopygia of *Cardiocladius*. (a) *C. africanus*; (b) *C. oliffi*; (c) *C. hessei*; (d) *C. latistilus*.

Hypopygium (Text-fig. 7, d) with a very characteristic broad and flattened style, with a single small apical spine; coxite lobe also distinctive and simple, anal point absent.

Female very similar to male; one specimen has wing length only 2.0 mm.

Holotype male and 2 paratypes NATAL: Natal National Park, 12.v.54 (*W. D. Oliff*). Other paratypes, TRANSVAAL: 1 ♀, Olifants River, Loskop Dam, v.1955

and 2 ♀, Swaziland, Komati River, v. 1955 (*A. D. Harrison*). Holotype in British Museum.

Cardiocladius hessei sp. n.

A fairly large yellowish brown species, the only African species known to me with separate scutal stripes in the male. Dorso-central bristles small and biserial, male styles parallel-sided and with two apical spines in the only known specimen.

Male. Wing length 3.0 mm.

Head brownish yellow, palpi brown, antennae rather short, A.R. about 0.8, plumes greyish. *Thorax* with a brownish yellow background, stripes dark brown and separate, the central one reaching back to the scutellum; scutellum and prothorax yellow, postnotum and sternopleuron brown; whole thorax lightly dusted with grey. Acrostichal bristles absent, dorso-centrals shorter and much less obvious than in the other species, whitish and biserial. *Legs* mainly yellow; anterior femora dark at apex, tibiae and tarsi blackish brown, L.R. 0.7; middle and posterior knees slightly darkened, their tibiae and tarsi tinged with brown. *Wings* as in *africanus*, halteres yellow. *Abdomen* mainly yellowish, darker at the base, each segment paler on apical half, pubescence pale. Hypopygium (Text-fig. 7, c) with well developed coxite lobe, style quite straight and parallel-sided, somewhat flattened and with two apical spines, anal point absent.

Female not known.

Holotype male, CAPE PROVINCE, Montagu, x. 1910 (*R. Tucker*) in the South African Museum.

I take pleasure in naming this species in honour of Dr. A. J. Hesse, Curator of Insects in the South African Museum.

Genus *PSECTROCLADIUS* Kieffer

Psectrocladius Kieffer, *Mém. Soc. sci. Brux.* 30, 356; Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 331 (as a subgenus of *Spaniotoma*).

Eyes bare. Pulvilli present, broad and distinct, usually little shorter than the claws. Wings without either macrotrichia or distinguishable microtrichia, R_{2+3} ending midway between R_1 and R_{4+5} , Cu not or scarcely bent, An reaching far beyond posterior fork, squama with a complete fringe.

As explained earlier, I am following Edwards' (1929) definition of this group, but I prefer to regard it as a full genus and not a subgenus of *Hydrobaenus* (*Spaniotoma*).

Kieffer has described two species in this genus and I have been able to examine the types of both. The type of the first, *P. alpinus* Kieffer (1913, *Voy. Alluaud Jeanel Afr. Or. Ins. Dipt.* 1: 29) is in the Muséum National d'Histoire Naturelle, Paris. It is a female of *Orthocladius sensu lato*, definitely not a *Psectrocladius* as restricted by Edwards, but being in spirit it was difficult to identify further, especially in the absence of a male.

I have been able to borrow the type of the second species, which is *P. rhodesiae* Kieffer (1924, *Ann. Soc. sci. Brux.* 43 (1): 260), from the South African Museum,

Cape Town, and have found that it is not an Orthoclaadiine at all. This is fairly clear from the original description, which states that the eyes are strongly narrowed above. It is in fact a female *Cryptochironomus*, not in a very good condition, close to, but probably different from *C. forcipatus* Freeman.

The species given below is the only true *Psectrocladius* known to me from Africa south of the Sahara.

***Psectrocladius viridescens* Freeman.**

Psectrocladius viridescens Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 133.

Thorax greenish in male with reddish stripes, front legs dark, halteres pale, tibiae with one spur only, male hypopygium with conical anal point.

Male. Wing length 2.4 mm.

Head greenish, mouthparts brown, antennae brown, plumes pale, A.R. 1.5. *Thorax* greenish, mesonotal stripes separate and reddish, scutellum greenish, postnotum and sternopleura dark brown. *Legs* greenish yellow, front legs dark brown except for the femora, which are pale beneath; front tarsi with slight beard, L.R. 0.75; each tibia with a single spur only, pulvilli broad and well developed. *Wings* with produced anal lobe and fringed squama, costa slightly produced, posterior fork beyond cross-vein, Cu very slightly curved, An nearly reaching wing margin. Halteres pale. *Abdomen* blackish, hypopygium (Text-fig. 8, a) with well formed conical anal point; coxites narrow, inner lobe triangular, inner margin of styles straight.

Female similar to male; thorax yellow rather than green, abdomen pale beneath and on segment 9.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: 1 ♂, (holotype), Bergvliet, x.1952 (*K. M. F. Scott*). TRANSVAAL: Johannesburg, 1 ♂, iv.1954 and 1 ♀, vii.1954 (*A. D. Harrison*); 6 ♂, 2 ♀, Pretoria, iii.1954 (*G. Rudebeck*). A single male, TRANSVAAL, Olifantsvlei, viii.1954 (*A. D. Harrison*), has the thoracic stripes blackish and partially fused; I am treating this as a colour variety.

Genus **CHAETOCCLADIUS** Kieffer

Chaetocladius Kieffer, 1911, *Bull. Soc. ent. France* 1911, 182; Goetghebuer, 1942, in Lindner, *Flieg. Pal. Reg.* 3 (13), 57 (as subg. of *Orthoccladius*).

Spaniotoma subg. *Orthoccladius* Groups A and B, Edwards 1929, *Trans. ent. Soc. Lond.* 77, 337-8.

Bryophaeocladius Thienemann, 1934, *Encycl. Ent. Dipt.* 7, 36.

Eudactylocladius Thienemann, 1935, *Stett. ent. Zeit.* 96, 206; Goetghebuer, 1942, in Lindner, *Flieg. Pal. Reg.* 3 (13), 63 (as subg. of *Orthoccladius*); Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 202.

Eyes bare; humeral pits small, dorso-central hairs long and erect, their punctures easily visible; wing membrane with distinguishable microtrichia, usually visible under the low power of a monocular microscope ($\times 100$), readily distinguishable under a higher power; squamal fringe present; scutellum slightly and uniformly shining; the smooth bare area at its base scarcely distinguishable; empodium distinct.

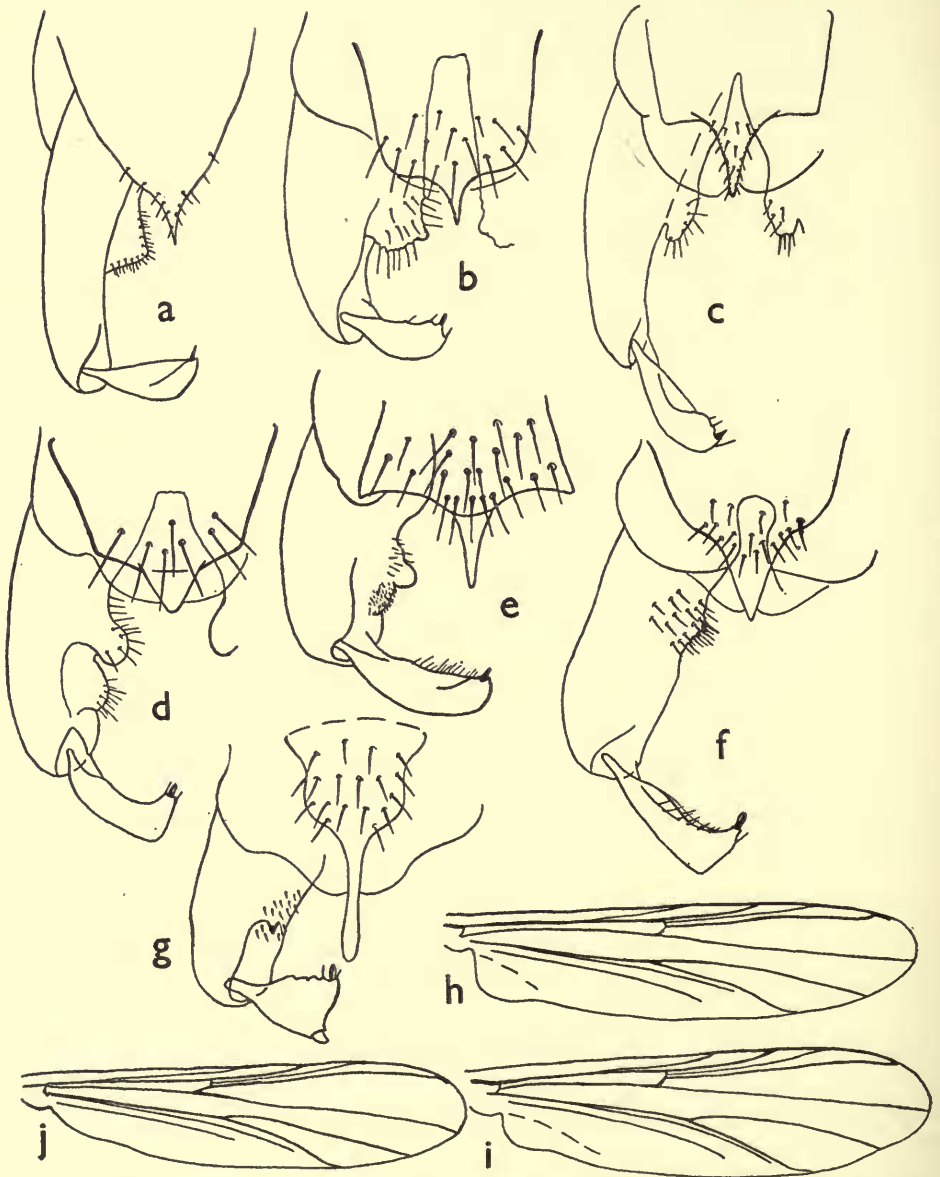


FIG. 8. Male hypopygia and wings of *Psectrocladius* and *Chaetocladius*. (a) *P. vivedescens*; (b) *C. melaleucus*; (c) *C. excerptus natalensis*; (d) *C. ruwenzoriensis*; (e) *C. productus*; (f) *C. brincki*; (g) *C. eastopi*; (h) *C. melaleucus*; (i) *C. excerptus natalensis*; (j) *C. ruwenzoriensis*.

Edwards (1929) did not consider the presence of distinct microtrichia on the wing membrane warranted more than species group status of his subgenus *Orthocladius*. As explained earlier, where there are reasonable characters for their separation, I am treating these groups as genera. *Bryophaenocladius* and *Eudactylocladius* do not seem to me to be sufficiently different for generic separation from *Chaetocladius*, although Goetghebuer (1942) separated them as a single subgenus of *Orthocladius*, that is, he gave them equal rank to *Chaetocladius*. He used the later name *Eudactylocladius*, giving the earlier *Bryophaenocladius* as a synonym, which is, of course, inadmissible under the Rules of Nomenclature.

The material at my disposal includes two species which are so similar to two Palaearctic species that I have had to treat one as identical and give the other subspecific status. I am unable to include *C. pallidus* Kieffer in the key.

KEY TO AFRICAN SPECIES OF *Chaetocladius*

1. Anal vein reaching well beyond posterior fork (Text-figs. 8, *h*, *i*) 2
 Anal vein ending only just beyond fork (Text-fig. 8, *j*) 3
2. Thorax dull black with 2 brilliant silvery pruinose stripes along lines of dorso-central bristles *melaleucus* Meigen
 Thorax shining and without these stripes *excerptus* Walker subsp. *natalensis* nov.
3. Male hypopygium with short broad anal point (Text-fig. 8, *d*) ; female antenna with forked sensory bristles, wings of male with reduced anal lobe (Text-fig. 8, *j*)
 *ruwenzoriensis* sp. n.
 Anal point longer, female lacking forked sensory bristles, wings of male with larger anal lobe 4
4. Anal point of male very long (Text-fig. 8, *g*) *eastopi* sp. n.
 Anal point shorter 5
5. Styles of male rounded, anal point narrower (Text-fig. 8, *e*) *productus* Freeman
 Styles of male angulated, anal point broader (Text-fig. 8, *f*) *brincki* Freeman

Chaetocladius melaleucus Meigen

Chironomus melaleucus Meigen, 1818, *Syst. Besch.* 1, 39.

Spaniotoma melaleuca Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 337.

A species with conspicuous silvery stripes along the lines of the dorso-central bristles. I am quite unable to find any differences whatsoever between the African specimens and specimens from Britain.

Male. Wing length 3.0 mm.

Head, antennae and mouthparts black with some grey dusting ; A.R. about 1.75 (in British specimens it is variable and may be as low as 1.5). *Thorax* matt black with conspicuous silvery pruinosity on shoulders, along lines dorso-central bristles and on two rectangular patches on prescutellar area ; pleura pruinose but not as strongly as on shoulders ; bristles pale. *Legs* blackish, L.R. about 0.6, empodium well developed, middle tibia with two short spurs. *Wings* with well developed microtrichia ; venation as in Text-fig. 8, *h*, posterior fork long and narrow, anal lobe slightly produced, squamal fringe complete. Halteres dark brown (in British specimens they vary from yellow to brown). *Abdomen* blackish, hairs paler. Hypo-

pygium (Text-fig. 8, *b*) with short sharp anal point, exactly similar to British specimens.

Female similar to male in colour and pattern, except for scutellum which is brown.

DISTRIBUTION. UGANDA: 1 ♂, 1 ♀, Kigezi Province, Mt. Muhavura, 13,000 ft., xi.1934 (*J. Ford*); 1 ♂, Ruwenzori Range, Lake Bujuku, 13,050 ft., vii.1952 (*D. S. Fletcher*).

Chaetocladius excerptus Walker subsp. *natalensis* subsp. n.

C. excerptus, a Palearctic species described from Britain (Walker, 1856, *Ins. Britannica* 3, 179), differs from the other members of the genus by the strong pits to the dorso-central bristles, by the hairy anal point and by the costa ending at the tip of R_{4+5} . These characters make it readily recognizable. The African specimens are identical in all respects except for the shorter antennal ratio (0.6 against 1.2) and the smaller anal lobe to the wing. As both these characters are somewhat variable I prefer to treat the specimens as belonging to a subspecies of *excerptus* rather than to a distinct species.

Male. Wing length 2.0 mm.

Head, antennae and mouthparts blackish; antennae rather short, especially apical segment, so that A.R. only about 0.6. *Thorax* of holotype with stripes, postnotum and sternopleuron black, ground colour of mesonotum yellowish, prescutellar area brown; mesonotum rather brightly shining though not brilliant; in paratype the stripes are partially fused; this colour variation is exactly as in typical subspecies. Pits from which dorso-central bristles arise well developed, larger than usual, bristles black. *Legs* brown, L.R. about 0.8, pulvilli absent, empodium present; both spurs on middle tibia very short. *Wings* with well developed microtrichia on the membrane, anal lobe reduced, venation as in Text-fig. 8, *i*, costa not produced, squama with fringe, halteres with dark knobs. *Abdomen* very dark brown, bristles black; hypopygium (Text-fig. 8, *c*) with hairy anal point, exactly similar to typical subspecies.

Female not known.

Holotype male, NATAL: Kamberg Game Reserve, Mooi River, 6,000 ft., ix.1953 (*A. D. Harrison*); paratype, 1 ♂, TRANSVAAL: Lydenburg Distr., Waterval, Mt. Rang Rang, iv.1955 (*A. D. Harrison*), both in British Museum.

Chaetocladius ruwenzoriensis sp. n.

A large black species, female with forked sensory bristles on basal half of antenna, male with short triangular anal point. For these reasons it does not fit exactly into the grouping given by Edwards (1929) for the British species of his subgenus *Orthocladius* Group B, the female falling into series 1 and the male into series 2. It is not unlike the Palearctic species *vernalis* Goetghebuer in general appearance.

Male. Wing length 3.0 mm.

Head, mouthparts and antennae black, pedicel and vertex pruinose, plumes black; A.R. about 0.75. *Thorax* mainly black, prothorax, shoulders and lateral margins yellowish brown, dorso-central bristles black and uniserial; seen from the front, mesonotum slightly shining, prescutellar area pruinose; pleural membrane yellowish,

scutellum brown, remainder of thorax black with some pruinosity. *Legs* blackish brown, L.R. 0.7, pulvilli absent, empodium present, middle tibia with outer spur half length of inner. *Wings* (Text-fig. 8, *j*) colourless by transmitted light, microtrichia well developed, anal lobe absent, squama with fringe of about 4 hairs, venation as in figure. Halteres pale. *Abdomen* very dark brown, hairs blackish. Hypopygium (Text-fig. 8, *d*) with blunt bare anal point, IXth tergite hairy, coxite lobes separated, style angulated.

Female. Very similar to the male in colour; antennae with sensory bristles forked on the basal half.

Holotype male and paratypes 1 ♂, 1 ♀, UGANDA: Kigezi Distr., Mt. Muharura, 10-12,000 ft., xi. 1934 (*F. W. Edwards*), all in British Museum.

Chaetocladius productus Freeman

Eudactylocladius productus Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 202.

Quite closely resembles the Palaearctic species *C. nitidicollis* Goetghebuer, but easily distinguished by the different coxite lobe and the apical single spine to the style. Black, without paler markings in the male, female with scutal stripes more or less separated; cross-vein oblique, sensory hairs of female antenna simple. Separated from the previous three species by the shorter anal vein and the much smaller size; externally inseparable from the following two species.

Male. Wing length 1.5 mm.

Head, antennae and mouthparts black, A.R. variable, 2-3.0. *Thorax* black, pleural membrane brownish, scutum with some pruinosity along the lines of the dorso-central bristles. *Legs* pitchy, empodium distinct, L.R. about 0.7. *Wings* with microtrichia just distinguishable under a magnification of $\times 200$; venation very similar to *ruwenzoriensis* (Text-fig. 8, *j*), costa perhaps more produced, reaching about one-third the distance to M, anal lobe more produced, nearly right angled; squama with 4 bristles. Halteres dark. *Abdomen* black; hypopygium (Text-fig. 8, *e*) with well formed, bare, anal point; IXth tergite hairy, coxite rather short with inner lobe as shown, style without inner flange, sometimes broader than shown, apical spine simple.

Female. Paler than male, head yellowish, thorax yellowish with separate black stripes, scutellum, postnotum and sternopleuron dark; sensory hairs of antenna simple, last segment as long as two preceding together.

Holotype male in British Museum, type locality, CAPE PROVINCE, Berg R., Wellington.

DISTRIBUTION. CAPE PROVINCE: series of both sexes, Berg River, Wellington, v. 1952 and iv. 1953 (*K. M. F. Scott*); 1 ♂, Mossel Bay, ii. 1922 (*R. E. Turner*). NATAL: 3 ♂, 2 ♀, Weenen, xii. 1923-i. 1924 (*H. P. Thomasset*). TRANSVAAL: 3 ♂, 1 ♀, nr. Johannesburg, Witpoortjie Falls, xi. 1954 (*A. D. Harrison*). BELGIAN CONGO: 5 ♂, P.N.A., cratère Mugunga, 1933 (*de Wulf*, in Mus. R. Congo belge). KENYA: long series in spirit, Muguga, i. 1953, v. 1953, x. 1953 (*V. F. Eastop*). ETHIOPIA: 1 ♂, Waldia, ii. 1936 (*J. W. S. Macfie*). GOLD COAST: 1 ♂, Accra iv. 1911 (*A. Connal*).

Chaetocladius brincki Freeman

Eudactylocladius brincki Freeman, 1955, *South African Animal Life*. Uppsala, 2, 252.

Typically, this species only differs from *productus* in the structure of the male hypopygium (Text-fig. 8f) in which the anal point is broader, the IXth tergite of a different shape, the coxite lobe reduced and the style angulated. However, there are some specimens in which the style is more rounded and the coxite lobe larger, which suggests that the two species may not really be distinct.

Holotype male in Lund University Museum.

DISTRIBUTION. CAPE PROVINCE: holotype male, Tzitzikama Forest, Storms River (*P. Brinck*). BELGIAN CONGO: 1 ♂, 3 ♀, P.N.A., cratère Mugunga (*de Wulf*); 2 ♂, Lulenga, Mission Rugari (*de Wulf*), all in Mus. R. Congo Belge. KENYA: 3 ♂, Molo, x. 1954 (*V. F. Eastop*); 6 ♂, 1 ♀, Aberdare Range, Mt. Kinangop, 8,000 ft., x. 1934 (*F. W. Edwards*).

Chaetocladius eastopi sp. n.

This species is known to me only as two males mounted on slides. It appears to be separable from *productus* and *brincki* only by the structure of the male hypopygium (Text-fig. 8, g). Anal point long and narrow, IXth tergite with a waist, inner coxite lobe very small, styles triangular and with a spur on their outer angle.

Holotype male and paratype 1 ♂, KENYA: Nachingwea, xi. 1953 (*V. F. Eastop*), both in British Museum.

Chaetocladius pallidus Kieffer

Dactylocladius pallidus Kieffer, 1918, *Ann. Mus. nat. Hung.* 16, 82.

I have seen the holotype female of this species which is in the Hungarian National Museum. It is a small yellow *Chaetocladius* falling into group B of Edwards' (1929) classification. Thoracic markings reddish; wings torn, but posterior fork well distal to cross vein, distinct microtrichia present; squama with one hair, antennal sensory hairs simple. It is very similar to *brincki*, but is smaller and paler. It will be necessary to examine more material from the type locality before any final description can be made.

Type locality, ABYSSINIA, Marako.

Genus *ORTHOCLADIUS* van der Wulp

Orthocladius van der Wulp, 1874, *Tijdschr. v. Ent.* 17, 132; Kieffer, 1906, *Genera Insect.* fasc. 42, 25 (in part).

Spaniotoma subg. *Orthocladius* Groups C-F, Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 344-50.

Orthocladius sens. str. and subg. *Pseudorthocladius* Goetghebuer, 1932, *Faune de France* 23, 84, 93; Goetghebuer, 1942, in Lindner, *Die Flieg. Pal. Reg.* 3 (13), 31 and 73.

Pseudorthocladius (Goetghebuer) Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 134.

Hydrobaenus (Fries) Edwards, 1940, *Ibid.* 9, 154-6 (in part).

Eyes bare; wing membrane without distinguishable microtrichia even under a 1/6 in. objectives; smooth bare area at base of scutellum usually sharply marked

off from dull apical area; empodium variable, pulvilli absent; squama fringed, R_{2+3} ending distinctly in costa, clearly separated from R_{4+5} .

With the restriction of this genus to Groups C-F of Edwards' (1929) classification, the name *Spaniotoma* is excluded because of the uncertainty of its position. I prefer to regard *Hydrobaenus* Fries as a separate genus because of the reduced antennae and palpi, and the large prothorax. It has a different appearance because of the shorter, thicker legs with tarsal segment 4 shorter than 5. I am not now recognizing *Pseudorthocladius* as a genus or subgenus because the characters for its definition are slight and there are few species included.

Apart from the seven species keyed below, there are five other species described by Kieffer, three in *Dactylocladius*, one in *Camptocladius*, and one in *Psectrocladius* which may belong here, but which it is not possible to place accurately at present. Brief diagnoses and notes on these are given at the end of the genus.

KEY TO AFRICAN SPECIES OF *Orthocladius*

- | | |
|---|-----------------------------|
| 1. Costa not clearly produced (Text-fig. 9, <i>a</i>) | 2 |
| Costa clearly produced (Text-fig. 9, <i>b-d</i>) | 4 |
| 2. Squama with complete fringe, thorax dull with grey pruinosity | <i>bergensis</i> Freeman |
| Squama with only 2-3 hairs, thorax rather shining | 3 |
| 3. Halteres blackish, A.R. about 2.0 | <i>nigerrimus</i> Kieffer |
| Halteres white, A.R. about 1.5 | <i>pretorianus</i> Kieffer |
| 4. Posterior fork wide (Text-fig. 9, <i>b, d</i>) | 5 |
| Posterior fork narrow (Text-fig. 9, <i>c</i>) | 6 |
| 5. Posterior fork very short, costa greatly produced (Text-fig. 9, <i>d</i>) | <i>megalochirus</i> Kieffer |
| Posterior fork longer, costa less produced (fig. 9, <i>b</i>) | <i>lobiger</i> Freeman |
| 6. Entirely black in both sexes except for halteres | <i>conicus</i> Freeman |
| Thorax with some paler areas either laterally or on shoulders, or stripes may be | |
| brown | <i>similis</i> Freeman |

Orthocladius bergensis Freeman

Orthocladius bergensis Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 135.

A fairly large species, dark in the male with pruinose mesonotum, similar to European species of the *thienemanni* group. The female has separate mesonotal stripes and elongate apical antennal segment.

Male. Wing length 2.25 mm.

Head dark, face yellow; antennal pedicel black, flagellum and plumes pale, A.R. about 1.2. *Thorax* largely dull black with grey pruinosity, prothorax yellow; mesonotum paler on lateral margins, brownish on shoulders, stripes fused but just distinguishable by their slightly darker colour in most specimens; pleural membrane yellow, scutellum, postnotum and sternopleuron black. *Legs* uniformly brown, L.R. 0.7, pulvilli absent. *Wings* brownish by transmitted light; R_{2+3} ending at about one-third distance between R_1 and R_{4+5} (Text-fig. 9, *a*), costa not produced, posterior fork below cross-vein which is nearly transverse, lower branch of fork slightly arched; anal lobe well formed, squama with complete fringe. Halteres yellow. *Abdomen* black; hypopygium (Text-fig. 9, *e*) with hairy anal point, coxite with inner process, style rounded externally.

Female. Wing length 2-2.25 mm.

Head and pedicel yellow, scutal stripes separate, ground colour of mesonotum yellow with grey pruinosity, pleura largely yellow, sternopleuron black on ventral half, scutellum brown, postnotum black; antennal segments 3-5 moniliform, 6 as long as 3-5 together; wing venation as in male, halteres yellow; abdomen brownish.

Holotype male in British Museum, type locality Cape Province, Berg River, Wellington.

DISTRIBUTION. CAPE PROVINCE: type series from Berg River, Wellington and Piquetberg v-vii.1952 and ix.1952 (*K. M. F. Scott*); 1 ♂, Mossel Bay, viii.1932 (*R. E. Turner*); 1 ♂, Table Mt., vii.1951 and 19 ♂, Rhodes, iii.1951 (*P. Brinck*). NATAL: 5 ♂, 3 ♀, Mooi River, Keate's Drift, vii-viii.1954 (*W. D. Oliff*). TRANSVAAL: 7 ♂, 4 ♀, Olifantsvlei, nr. Johannesburg, v-viii.1954 (*A. D. Harrison*).

Orthocladius conicus Freeman

Orthocladius conicus Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 201.

Entirely black except for halteres; A.R. 1.5; costa produced, anal lobe slightly produced; anal point short and bare.

Male. Wing length 1.6-1.75 mm.

Head, antennae and mouthparts black; A.R. about 1.5. *Thorax* quite black with some greyish pruinosity, dorso-central bristles uniserial. *Legs* brownish black, trochanters paler, empodium small, pulvilli absent, L.R. 0.6. *Wings* with costa produced for about one-third of distance from R_{4+5} to M_{1+2} , r-m not particularly transverse, posterior fork slightly distal to cross-vein, Cu slightly curved, An reaching well beyond fork; anal lobe distinguishable but rounded and only slightly produced; squama with fringe of about 7 hairs. Halteres yellowish white. *Abdomen* black; hypopygium (Text-fig. 9, f) with anal point short and conical, of variable width, broader in holotype than in other males; anal point bare, IXth tergite hairy on its apical half; coxite with small inner lobe, style simple.

Female very similar to male, costa more strongly produced; last antennal segment shorter than in *bergensis*, only equal to 4-5 together.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: 2 ♂ including holotype, Berg River, Piquetberg, ix.1952, 7 ♀, iv.1953; 1 ♀, Bergvliet, v.1953; 1 ♀, Wellington, v.1953 (all coll. *K. M. F. Scott*).

Orthocladius lobiger Freeman

Pseudorthocladius lobiger Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 201.

Orthocladius reductus Freeman, 1954, *Ibid.* 23, 173 (SYN. NOV.).

Owing to an error in generic determination this species was unfortunately described twice. It is easily recognized in both sexes by the venation and the flattened fifth tarsal segment; male with terminal antennal segment bilobed and anal point very short. It belongs to Edwards' Group D and is close to the European species *apicalis* Kieffer from which it may readily be separated by the absence of macrotrichia at the wing tip.

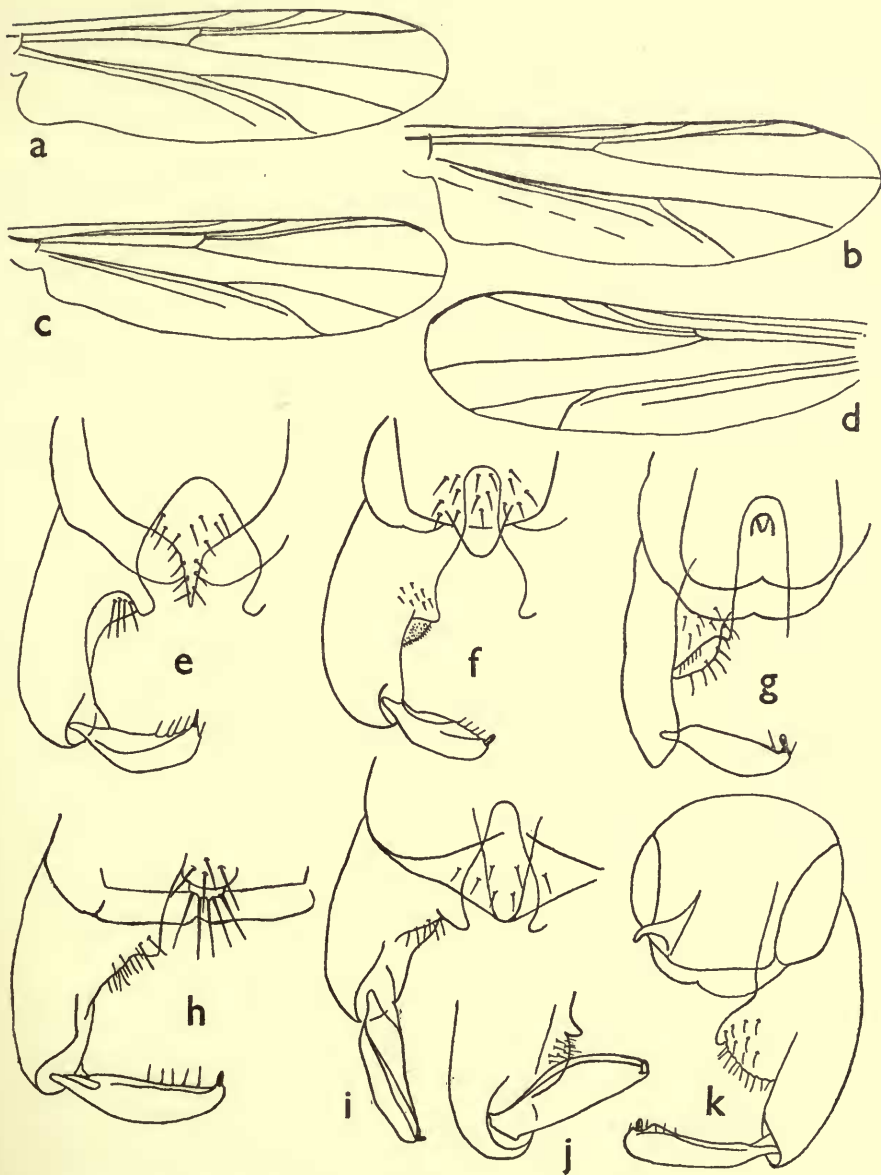


FIG. 9. Wings and hypopygia of *Orthocladius*. (a) *O. bergensis*; (b) *O. lobiger*; (c) *O. similis*; (d) *O. megalochirus*; (e) *O. bergensis*; (f) *O. conicus*; (g) *O. lobiger*; (h) *O. similis*; (i) *O. nigerrimus*; (j) *O. nigerrimus* with style from different aspect; (k) *O. megalochirus* from half side.

The antennal ratio and size of wing lobe are both highly variable. This seems to be correlated to some extent with size; the smaller specimens have a low A.R. and an obtuse lobe, the larger ones have A.R. as much as 0.8 and the lobe slightly produced, also the plumes are better developed. The hypopygium, wing venation and leg structure are identical for all specimens and intermediate stages of A.R. and wing lobe are present in the series examined; I am therefore treating them as belonging to the same species.

Male. Wing length 1.5–6 mm.

Head brownish black, mouthparts and antennae black; A.R. varying from 0.25–0.8, plumes scanty and not very long, last segment clubbed and with short hairs, bilobed as in *Nanocladius biloba* Freeman (Text-fig. 11, *g*). *Thorax* black, slightly shining, stripes more or less fused, shoulders pale, scutellum brown. *Legs* dark brown, L.R. about 0.8, pulvilli present as short rounded pads, empodium long, last tarsal segment dorso-ventrally flattened. *Wings* tinged with brownish; costa slightly produced (Text-fig. 9, *b*) R_{2+3} close to R_{4+5} for most of its length but ending separately and quite distinctly in the costa; posterior fork well distal to cross-vein, Cu_1 straight, An ending opposite fork; anal lobe either obtuse or slightly produced, squama with fringe of 3–5 hairs. Halteres brown. *Abdomen* black, hypopygium (Text-fig. 9, *g*) with extremely short anal point, coxa narrow with well developed inner lobe.

Female similar to male; antennae short, segment 6 not bilobed and equal to 4–5 together; last tarsal segment flattened, venation as in male. In some specimens stripes separate, ground colour of thorax pale.

Holotype males of both species in British Museum, type locality of *lobiger*, CAPE PROVINCE: Berg River, Wellington, of *reductus*, Berg River, Assegaibos.

DISTRIBUTION. CAPE PROVINCE: various localities along Berg River and at Kirstenbosch, v. 1952, x. 1952, iv–v. 1953 (*K. M. F. Scott*). NATAL: 1 ♂, Natal Nat. Park, Oliviershoek Bridge, viii. 1954 (*W. D. Oliff*); 3 ♂, Mooi River, Mont aux Sources, xi. 1954 (*W. D. Oliff*).

Orthocladius similis Freeman

Pseudorthocladius similis Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 134.

This species was described from a single male from the Cape resembling the European species *O. curtistylus* Goetghebuer. The type is a small black insect with mesonotum yellow laterally. More material is now available of both sexes and it is seen to be quite variable in colour. Another Cape male has shoulders and pleura yellow; the female is pale brown with darker stripes on the thorax. Males from Belgian Congo are brown rather than black, resembling the females, but occasional darker specimens are to be found; in addition the width of the styles varies. All agree in the structure of the ninth tergite (Text-fig. 9, *h*) and in wing venation; narrow pulvilli present.

Male. Wing length 1.5 mm.

Head brown, mouthparts and antennae, including plumes black; A.R. about 0.9. *Thorax* of holotype black, mesonotal stripes indicated by pruinosity along lines of dorso-central bristles; lateral mesonotal margins narrowly yellow and with some

yellow on upper parts of pleura; other specimens have more yellow, especially on shoulders, or are brownish yellow with brown stripes. *Legs* uniformly dark brown, empodium well developed, narrow pulvilli present. *Wings* slightly purplish by transmitted light; venation as in Text-fig. 9, *c*, costa produced, posterior fork beyond cross-vein; anal lobe small but distinguishable, squama with fringe of 4-5 hairs. Halteres black in type, paler in pale specimens. *Abdomen* black; hypopygium (Text-fig. 9, *h*) without anal point but with slight prominence bearing hairs, coxite lobe small, style of holotype narrow but in other specimens may be more expanded.

Female pale brown with darker brown thoracic markings, shoulders yellow; antennae with 6 segments, the last segment one and a half times as long as 5.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: 2 ♂, 2 ♀, including holotype, Berg River, ix-x.1952 and i-ii.1953 (*K. M. F. Scott*). NATAL: 1 ♂, 1 ♀, Mooi River, Kamburg Game Reserve, ix.1953 (*A. D. Harrison*). BELGIAN CONGO: 4 ♂, Rutshuru, i.1934 (*de Wulf*); 2 ♀, Nyragongo, 10,000 ft. (*de Wulf*); 1 ♂, Musosa, x.1939 (*H. J. Brédo*); 1 ♀, Elizabethville, xii.1939 (*H. J. Brédo*).

Orthocladius nigerrimus Kieffer

Camptocladius nigerrimus Kieffer, 1918, *Ann. Mus. nat. Hung.* 16, 81.

I have been able to borrow a cotype male of this species and can state that it does not belong to *Camptocladius* (*Smittia*) as now defined because of the presence of squamal hairs.

Black, rather shining, posterior fork shorter than in *similis*, A.R. about 2.0; halteres blackish, male hypopygium very characteristic.

Male. Wing length 1.25 mm.

Head, mouthparts, antennae black, A.R. about 2. *Thorax* shining black, stripes fused. *Legs* dark brown, L.R. 0.4, pulvilli absent. *Wings* slightly brownish by transmitted light, anal lobe as in *similis*; venation differs from *similis* (Text-fig. 9, *c*) by the shorter posterior fork and by the costa not being clearly produced (Kieffer says it is strongly produced, but this seems to be wrong). Halteres blackish. *Abdomen* black; hypopygium (Text-figs. 9, *i, j*) very characteristic; IXth tergite with slight conical central ridge but no anal point; coxite lobe as shown; style rather tapered, with small apical spine which is obscured in some aspects (Text-fig. 9, *j*), and with a narrow transparent inner margin which is quite typical.

Female small and black, very similar to the male. Antennae with 6 segments, last segment one and a half times as long as 5, segments 3-5 twice as long as wide.

Described by Kieffer from two males in Hungarian National Museum. Type locality, ETHIOPIA: Sidamo.

DISTRIBUTION. CAPE PROVINCE: 1 ♂, Mossel Bay, ii.1922 (*R. E. Turner*). NATAL: 5 ♂, Weenan, xii.1923 (*H. P. Thomasset*). BELGIAN CONGO: 3 ♂, 2 ♀, Escarpment Kabasha, Chambi, x.1933 (*de Wulf*); 3 ♂, Parc. Nat Albert, cratère Mugunga (*de Wulf*); 1 ♂, N. Kivu, Kibati, x.1933 (*de Wulf*). ETHIOPIA: 16 ♂, River Alamata, Koram road, xi.1936 (*J. W. S. Macfie*).

***Orthocladius megalochirus* Kieffer**

Dactylocladius megalochirus Kieffer, 1911, *Trans. Linn. Soc. Lond. (Zool.)* **14**, 363.

Easily distinguished from the other species by L.R. being almost 1.0, by the short posterior fork and by the greatly produced costa.

Male. Wing length 1.0 mm.

Head, antennae and mouthparts blackish, A.R. 0.6. *Thorax* black, slightly pruinose. *Legs* brown, L.R. almost 1.0, pulvilli absent, empodium not discernible in the holotype. *Wings* (Text-fig. 9, *d*) with characteristic venation, posterior fork being short and wide and the costa greatly produced, anal angle reduced, squama with two hairs; halteres pale. *Abdomen* black; hypopygium (Text-fig. 9, *k*) with bare thorn-like anal point which stands more or less vertically, coxite lobe well developed, style narrow.

Female not known.

Known only from the holotype male in the British Museum, Seychelles: Mahé, top of Mt. Sebert, 1,800 ft.

***Orthocladius pretorianus* Kieffer**

Camptocladius pretorianus Kieffer, 1918, *Ann. Mus. nat. Hung.* **16**, 80.

I borrowed a cotype male of this species from the Hungarian National Museum but found that it lacked antennae, most of the legs and the hypopygium. Also the wings were folded and the venation difficult to see.

It is a small black fly with shining mesonotum and pale halteres; wing membrane without distinguishable microtrichia, squama with two hairs. In the original description Kieffer states that A.R. is 1.5, L.R. 2.0 and that the costa is not produced.

Type locality, TRANSVAAL: Pretoria.

? *Orthocladius alpinus* Kieffer

Psectrocladius alpinus Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* **1**, 29.

Although I have seen the type female of this species in Muséum National d'Histoire Naturelle, Paris, I was unable to examine it in as much detail as I would have liked and I am unable to place it accurately in a genus. It is clearly not *Psectrocladius* as now defined. I am placing it in *Orthocladius* until a more detailed examination can be made.

Female. Length 2 mm.

Clear yellow, thoracic markings and most of upper parts of abdomen brown black; eyes bare; antennae with six segments, 6 a little longer than 5; wings punctate, without distinguishable microtrichia, costa strongly produced, posterior fork distal to cross-vein; L.R. 0.5, narrow pulvilli present.

Type locality, KENYA: heath zone, 10-12,000 ft., i. 1912.

? *Orthocladius lacustris* Kieffer

Dactylocladius lacustris Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 30.

The type specimen of this species was not marked by Kieffer and I was uncertain which specimen was truly the type.

Female. Length 1.5 mm.

Brown black, halteres pale; antennae 6 segmented, 6 nearly twice as long as 5; wings punctate, cross-vein oblique, costa strongly produced, posterior fork distal to cross-vein; L.R. 2.

Type female in Muséum National d'Histoire Naturelle, Paris; locality, KENYA: Naivasha, on the shore of the lake, 6,000 ft., xii. 1911.

? *Orthocladius sancti-benedicti* Kieffer

Dactylocladius sancti-benedicti Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 30.

I have seen the type series of this species but was unable to examine them closely enough to permit accurate placing in a genus.

Length: male 3 mm., female 2.5 mm.

Male entirely brown black, female greenish with brown antennae and legs; A.R. nearly 2; female antennae 7 segmented, segments 3-6 subcylindrical, 7 twice as long as 6; wings punctate, costa well produced, posterior fork a little distal to cross-vein; L.R. 0.7, pulvilli absent; coxite lobe as wide as long, styles curved, extremity incurved.

Type series in Muséum National d'Histoire Naturelle, Paris, in spirit. Locality, KENYA: Forest of Nairobi, Kyambu, 5,300 ft., xi. 1911.

? *Orthocladius kinangopi* Kieffer

Dactylocladius kinangopi Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 31.

I have seen the female type of this species but was unable to examine it in sufficient detail to place it accurately in a genus.

Female. Length 2 mm.

Yellowish, antennae, and transverse ventral bands on abdominal segments brown, thoracic markings black brown, legs brownish; antennae 7 segmented, segments 2 and 3 equal and cylindrical, 4 and 5 longer, narrower in apical third, 6 subcylindrical only half as long as 5, 7 twice as long as 6; wings punctate, costa produced, posterior fork distal to cross-vein; L.R. 2.

Type female in Muséum National d'Histoire Naturelle, Paris. Type locality, KENYA: Aberdare Range, Mt. Kinangop, 8,500 ft., ii. 1912.

? *Orthocladius nilicola* Kieffer

Dactylocladius nilicola Kieffer, 1923, *Ann. Soc. ent. France* 92, 182.

The type of this species is lost and I am very doubtful of the genus to which it should be assigned. The following is a summary of the characters given by Kieffer.

Female. Length 1.0 mm.

Brown; eyes bare; antennae 6-segmented, yellow, pedicel brown, segment 2 as long as 3, 3-5 elongated, gradually contracted apically, 6 two and a half times as long as 5; wings finely punctate, the punctures almost setiform; r-m cross-vein not formed, as in *Tanytarsus*; costa greatly produced, for as much as one-third length of R_{4+5} , posterior fork distal to cross-vein; L.R. 2, empodium longer than the claws; abdomen with the posterior edge of the tergites paler.

Type locality, SUDAN: Shambe, ii. 1912.

Genus *NANOCLADIUS* Kieffer

Nanocladius Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 31; Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) 23, 175.

Eukiefferiella Thienemann, 1926, *Arch. Hydrobiol.* 17, 325; Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 350; Goetghebuer, 1944, in Lindner, *Flieg. Pal. Reg.* 3, 114.

Microcricotopus Thienemann and Harnisch, 1932, *Zool. Anz.* 99, 137.

Akiefferiella Thienemann, 1936, *Stettin. ent. Ztg.* 97, 43.

Parakiefferiella Thienemann, 1936, *Ibid.* 97, 43.

Camptokiefferiella Goetghebuer, 1944, in Lindner, *Flieg. Pal. Reg.* 3, 122 (as subg. of *Eukiefferiella*).

Eyes bare or pubescent; squama with incomplete fringe or bare; wings without distinguishable microtrichia or macrotrichia; R_{2+3} appearing absent owing to its lying in close contact with R_{4+5} , gradually fading out towards the tip and not distinctly reaching the costa; costa retracted; Cu_1 usually straight, fork fairly wide, anal lobe not produced; pulvilli usually absent, when present quite small, empodium well developed.

Nanocladius was erected by Kieffer to include an East African species, *N. vitellinus* which automatically becomes the type species. As reported in 1954, I have been able to examine the female holotype and have found it to be a species of *Eukiefferiella* as defined by Edwards (1929), allied to the Palaearctic species *bicolor* Zetterstedt.

Microcricotopus was erected for a number of species including *Cricotopus albicornis* Goetghebuer (*Eukiefferiella bicolor* Zetterstedt) which was fixed by Goetghebuer (1944) as the type species. This genus will fall as a synonym of *Nanocladius*.

Edwards (1929) did not subdivide *Eukiefferiella* into subgenera, but Goetghebuer (1944) recognized five subgenera, four being groups earlier proposed by Thienemann as genera. Of the 30 Palaearctic species mentioned by Goetghebuer (1944), 21 fall into *Eukiefferiella* sensu stricto; the remaining 9 are divided amongst the other subgenera, depending on the presence or absence of pulvilli, squamal hairs and eye pubescence, and the shape of Cu_1 . The squamal hair fringe is tending to disappear throughout the genus and in one African species varies from 0-2 hairs, suggesting that this character is not very sound. The other characters used are also not very convincing because the pulvilli are small, the eye hairs tend to be fine and sparse and the shape of Cu varies a good deal in allied genera. It seems pointless in these circumstances to use subgenera based on rather insecure characters to split off small numbers of species. I am, therefore, considering all the subgenera to be synonyms of the earliest name, that is *Nanocladius*.

Kieffer has described only the one species *N. vitellinus* from Africa. Goetghebuer has described a species *E. metallescens*, but examination of the type has shown this to be a species of *Trichocladius* (q.v.). Most of the species described below are very similar to Palaearctic species.

KEY TO AFRICAN SPECIES OF *Nanocladius*

1. Eyes pubescent	2
Eyes bare	3
2. Apical antennal segment with about 10-12 long curved hairs, plume hairs of male white	<i>vitellinus</i> Kieffer
Apical antennal segment with short hairs only, plume hairs dark	<i>brunneus</i> Freeman
3. Antenna with apical rosette, abdomen of male white with segments 5, 8 and hypopygium black	<i>ephippium</i> sp. n.
No apical rosette, abdomen not like this	4
4. Squama with fringe of about 6 hairs	<i>angustistilus</i> Freeman
Squama with fringe of 1-3 hairs or bare	5
5. Cu ₁ bent, L.R. only 0.4	<i>brevitarsis</i> Freeman
Cu ₁ nearly straight, L.R. at least 0.7	6
6. Mesonotal stripes black, fused in male, anal point absent	<i>claviger</i> sp. n.
Mesonotal stripes brown, separated in both sexes, short anal point present	<i>biloba</i> Freeman

Nanocladius vitellinus Kieffer

Nanocladius vitellinus Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 32.

Eukiefferiella (Microcricotopus) niveipluma Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 203 (SYN. NOV).

Examination of the holotype of *vitellinus* has shown that my species must fall as a synonym.

Male matt black with white antennal plumes, female more yellowish with separate scutal stripes; eyes densely pubescent, small pulvilli present, antennae with 10-12 long curved hairs at the apex in both sexes; belongs to the group previously known as *Microcricotopus* Thienemann and Harnisch.

Male. Wing length 1-1.3 mm.

Head black, face browner, mouthparts and scape black, flagellum paler, plumes quite white; flagellum with 13 segments, last segment clubbed and with about 10-12 long curved hairs on its apical half; A.R. 0.3-0.4; eyes densely hairy. *Thorax* completely black, scutum matt. *Legs* brownish, tarsi rather paler, L.R. 0.6, small pulvilli present. *Wings* milky white, venation as in Text-fig. 10, *a*, squama with 2-3 hairs; halteres yellowish or brown. *Abdomen* black, sometimes white basally, hairs often whitish, hypopygium as in Text-fig. 11, *a*, with narrow hairy anal point, coxite with inner lobe, style angled at apex though angle varies somewhat.

Female. Wing length 0.75-1.3 mm.

Face yellow, vertex brown, antennal segments 3-5 more or less oval, 6 equal to preceding three in length and somewhat clubbed, with a number of long white curved hairs as in male. *Thorax* yellowish and with three darker stripes which are well separated; scutellum brown, postnotum and sternopleuron blackish; legs and wings as in male, halteres pale, abdomen dark.

Holotype female of *vitellinus* in Muséum National d'Histoire Naturelle, Paris, type locality, Tanganyika, Kilimanjaro, Kilema, 4,500 ft.; holotype male of *niveipluma* in British Museum, type locality, Cape Province, Berg River, Piquetberg.

DISTRIBUTION. CAPE PROVINCE: series from various localities along Berg River (K. M. F. Scott). NATAL: 3 ♂, Mooi River, Rosetta, ix. 1953 (A. D. Harrison). TRANSVAAL: 2 ♀, Tugela River, Colenso, ix. 1953 (A. D. Harrison). BELGIAN CONGO: 2 ♂, 1 ♀, Parc Nat. Albert, Vitshumbi (Lake Edward), ii. 1953 (J. Verbeke). UGANDA: 1 ♀, Lake Victoria (W. W. Macdonald). SUDAN: 3 ♂, 4 ♀, Wad Medani, ii. 1952 (D. J. Lewis); 4 ♂, 3 ♀, Khartoum (D. J. Lewis); 2 ♂, 12 ♀, Wau, x. 1952 (E. T. M. Reid); 2 ♂, Meroe, nr. Assuan (S. Hirst).

Nanocladius brunneus Freeman

Nanocladius brunneus Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) **23**, 175.

A small insect distinguishable from *vitellinus* by the yellowish brown thorax and shorter hairs at apex of antenna, the plumes of which are dark.

Male. Wing length 1.0 mm.

Head yellowish brown, palpi and antennae dark brown, plumes dark, A.R. about 0.3, apical segment slightly clubbed and with about 10 short, only slightly curved, hairs at the apex, not in the form of a rosette; eyes densely hairy. *Thorax* yellowish with brown stripes; postnotum and sternopleuron dark brown. *Legs* brown, pulvilli present, L.R. 0.6. *Wings* similar to *vitellinus*, halteres yellowish brown. *Abdomen* dark brown, hypopygium essentially similar to *vitellinus* (Text-fig. 10, a), anal point slightly shorter but this may be variable.

Female not known.

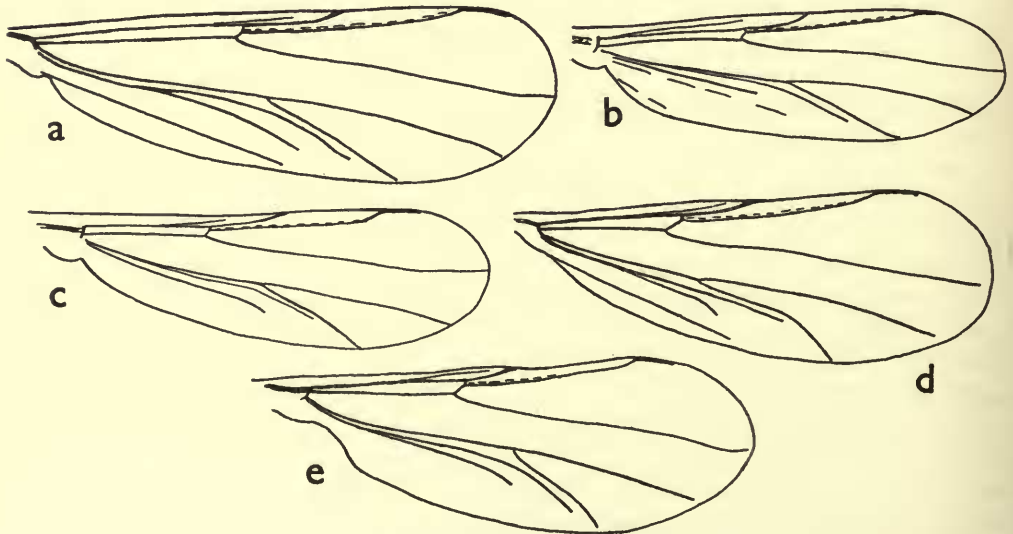


FIG. 10. Wings of male *Nanocladius*. (a) *N. vitellinus*; (b) *N. claviger*; (c) *N. ephippium*; (d) *N. brevitarsis*; (e) *N. biloba*.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE : holotype and 1 ♂ paratype, Berg River, Driefontein, iv. 1953 (*K. M. F. Scott*). TRANSVAAL : 1 ♂, Great Usutu River, Amsterdam, ix. 1954 (*A. D. Harrison*).

Nanocladius claviger sp. n.

Male with body quite black, thorax pruinose and slightly shining, female with separate stripes ; eyes bare, pulvilli absent, A.R. 0.5, squama with fringe of 2-3 hairs. Very similar to Palaearctic species *N. brevicealcar* Kieffer and *hospita* Edwards but antennae have different structure.

Male. Wing length 1.3 mm.

Head, mouthparts, antennae blackish, last segment of antenna clubbed, its apical third bare, A.R. about 0.5, flagellum with 13 segments, plumes dark ; eyes bare. *Thorax* black, slightly shining and pruinose ; when seen from the front pruinosity especially obvious on shoulders and prescutellar area. *Legs* brown, pulvilli absent, empodium as long as claws, L.R. 0.75. *Wings* (Text-fig. 10, *b*) with anal lobe better developed than in the other species, R₁ short, Cu₁ straight, posterior fork distal to r-m ; squama with 2-3 hairs ; halteres whitish. *Abdomen* black, hypopygium (Text-fig. 11, *b*) lacking anal point, coxite lobe well formed, style simple.

Female. General body structure and wing venation similar to male ; shoulders pale, stripes narrowly separated, antennae with last segment nearly as long as three preceding ones.

Holotype male and 2 ♂, 4 ♀, NATAL : Drakensberg, Giant's Castle Camp, 5,000 ft. 18.ix.53 (*A. D. Harrison*) ; holotype in British Museum, 3 paratypes placed in South African Museum.

Nanocladius angustistilus Freeman

Eukiefferiella (*Eukiefferiella*) *angustistilus* Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 205.

A brownish species with no strong markings, hardly to be distinguished from the European *calvescens* Edwards, paler in colour, A.R. shorter, rather smaller. Antennae with short hairs at apex, halteres pale, squamal fringe well developed, empodium small ; male hypopygium characteristic.

Male. Wing length 1.3 mm.

Head yellowish brown, palpi and antennae darker, flagellum 13-segmented, A.R. 0.4, last segment with short hairs at apex ; eyes bare. *Thorax* yellowish brown with three dark brown more or less separate stripes, humeral pits rather large, postnotum and sternopleuron blackish. *Legs* pale brown, L.R. 0.7, pulvilli absent, empodium short. *Wings* milky, costa produced and ending above tip of M₃₊₄, R₁ and posterior fork as in *vitellinus*, An ending before fork ; squama with well developed fringe of about 6 hairs ; halteres pale. *Abdomen* brown, hypopygium (Text-fig. 11, *c*) with well developed bare anal point, inner lobe of coxite not very prominent ; style narrow with small inner flange and two apical spines, the smaller being transparent, IXth tergite bare.

Female. More yellow than male, scutal stripes pale brown, poorly defined; apical antennal segment with short hairs, rather longer than preceding two together.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype and 1 ♂, Berg River, Wellington, v and xii. 1952; 1 ♂, 1 ♀, Berg River, French Hoek Forest Reserve, xi. 1952; 1 ♂, Berg River, Cecilia's Drift, xii. 1952 (all coll. *K. M. F. Scott*).

Nanocladius ephippium sp. n.

Male thorax black, abdomen yellow with segments 5 and 8 black, female brown with separate thoracic stripes; easily distinguished from all other African species known to me by the colour of the male and the presence of a rosette at the apex of the antenna in both sexes. Structurally hardly to be separated from the Palaearctic species *N. coronata* Edwards, but the colour suggests it is a different species.

Male. Wing length 1.0 mm.

Head, mouthparts, antennae brownish; scape black, plumes dark, flagellum with 13 segments, last segment short, A.R. only about 0.2-0.3, apical pubescence forming a rosette at the tip; eyes bare. *Thorax* black, slightly shining. *Legs* yellowish brown, pulvilli absent, L.R. 0.5. *Wings* (Text-fig. 10, *c*) with bare squama, Cu₁ with a trace of a bend, costa retracted, R₁ half as long as R₄₊₅; halteres whitish. *Abdomen* yellow, segments 5 and 8 and hypopygium black; hypopygium (Text-fig. 11, *d*) without anal point, coxite lobe right angled, style simple.

Female. Antennae with apical rosette as in male; scutum yellow with separate brown stripes, abdomen blackish, each segment paler along apical margin, in some specimens some segments are yellowish.

Holotype male and 16 ♂, 4 ♀ paratypes, NATAL: Mooi River, nr. Rosetta; other paratypes NATAL: 1 ♀, Mooi River, Kamberg Game Reserve; 1 ♂, Drakensberg, Giant's Castle Camp; 2 ♂, 1 ♀, Bushman's River, nr. Estcourt; 3 ♂, 1 ♀, Verdruck Dam, nr. Dundee (all coll. ix. 1953, *A. D. Harrison*). TRANSVAAL: 1 ♂, 2 ♀, Pongola River, Pongola Settlements; 1 ♂, 2 ♀, Gladdespruit, nr. Badplaats (all coll. ix. 1954, *A. D. Harrison*).

Nanocladius brevitarsis Freeman

Eukiefferiella (Camptokiefferiella) brevitarsis Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 205.

Readily distinguished from other species described here by the bent Cu and short L.R.; allied to the Palaearctic species *N. camptophleps* Edwards. Male black, female with separate scutal stripes; squama bare, anal point of male broad.

Male. Wing length 0.9 mm.

Head, mouthparts and scape black, flagellum brown with 11 segments, A.R. 0.4, apical antennal segment with short hairs at the tip; eyes bare. *Thorax* all black or very dark brown. *Legs* brown, empodium and pulvilli both absent, L.R. 0.4. *Wings* milky, venation as in Text-fig. 10, *d*; squama bare. Halteres yellow. *Abdomen* black, hypopygium (Text-fig. 11, *e*) with broad bare anal point, style evenly curved with no inner flange.

Female. Head and thorax with yellowish ground colour, mesonotal stripes dark brown and separate; postnotum, sternopleuron and abdomen brownish black; last antennal segment with short hairs on apical half and rather longer than preceding two together.

Holotype male in British Museum.

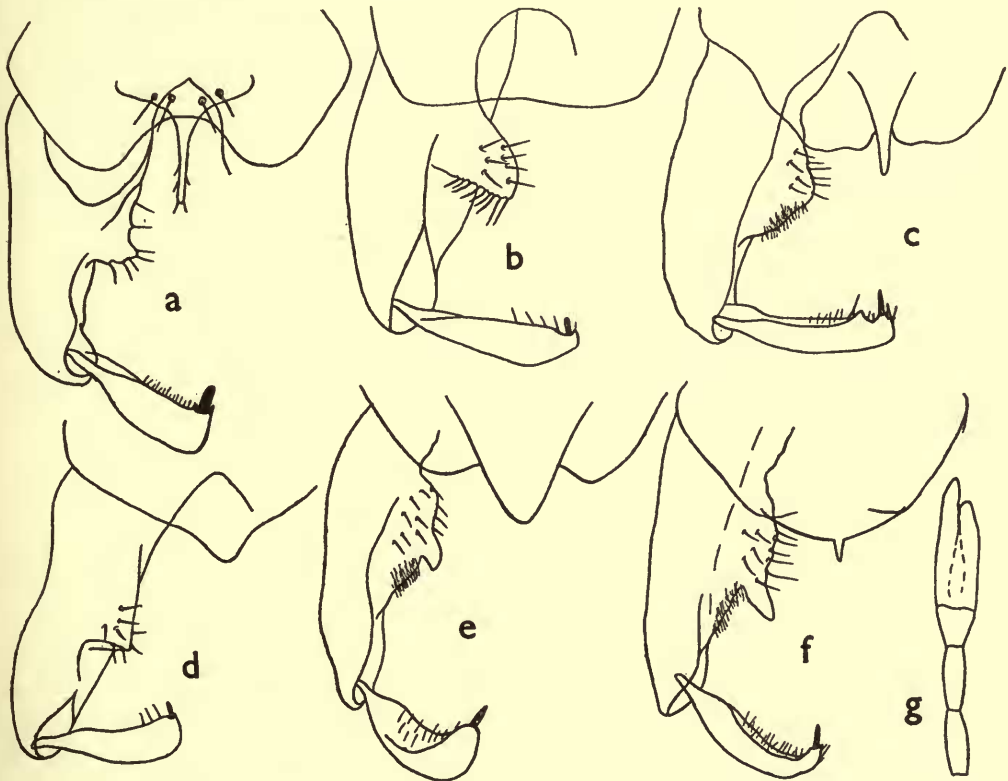


FIG. 11. Male hypopygia and male antennal apex of *Nanocladius*. (a) *N. vitellinus*; (b) *N. claviger*; (c) *N. angustistilus*; (d) *N. ephippium*; (e) *N. brevitarsis*; (f) and (g) *N. biloba*.

DISTRIBUTION. CAPE PROVINCE: type and 1 ♂, 1 ♀, Berg River, French Hoek, vii.1952; 1 ♂, 1 ♀, Berg River, Wellington, v.1952 and 9 ♂, 2 ♀, iv-v.1953; 1 ♂, Berg River, Piquetberg, ix.1952; 5 ♂, 1 ♀, Krom River, Stellenbosch, xii.1952 (all coll. K. M. F. Scott). NATAL: 1 ♂, Mooi River, Keate's Drift, iv.1954 (W. D. Oliff).

Nanocladius biloba Freeman

Eukiefferiella (? *Parakiefferiella*) *biloba* Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 205.

A minute insect with yellowish thorax and stripes. Last antennal segment of male short and appearing bilobed; vein R_{4+5} retracted, Cu_1 straight, squama with 0-2 hairs; anal point of male short.

Male. Wing length 1.0 mm.

Head, antennae and mouthparts brown, face sometimes yellow; eyes bare; flagellum with 12 segments, last segment short (Text-fig. 11, g) and bilobed at apex, penultimate segment short and forming part of the club; last segment with short hairs only. *Thorax* yellowish or brownish with three separate dark brown stripes; post-notum and sternopleuron dark brown or black. *Legs* pale brown, empodium well developed, pulvilli absent, L.R. 0.8. *Wings* slightly brownish, venation as in Text-fig. 10, e, costa and radius retracted, R₁ particularly short; squama either bare or with 1-2 hairs. Halteres brown. *Abdomen* brown; hypopygium (Text-fig. 11, f) with short anal point; shape of inner coxite lobe characteristic, style narrow and slightly bowed.

Female fairly uniform in colour, scutal stripes paler than in male; last antennal segment with short hairs, rather longer than preceding two together, not bilobed; legs and wings as in male.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype and 7 ♂, 9 ♀, paratypes, Berg River, French Hoek Forest Reserve, vii and x. 1952 (K. M. F. Scott); 3 ♂, Kirstenbosch, iv. 1952 (K. M. F. Scott). NATAL: 3 ♂, 3 ♀, Drakensberg, Tugela River, Royal Natal Nat. Pk., 5000 ft., ix. 1953 (A. D. Harrison).

Genus *LIMNOPHYES* Eaton

Limnophyes Eaton, 1875, *Ent. mon. Mag.* 12, 60; Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 354 (as subgenus of *Spaniotoma*); Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* 25, 204; Goetghebuer, 1944, in Lindner, *Flieg. Pal. Reg.* 3 (13g), 124.

Camptocladius van der Wulp, 1874, *Tidjschr. Ent.* 17, 133 (in part); Kieffer, 1914, *Ann. S. Afr. Mus.* 10, 261 (in part); Thienemann, 1921, *Arch. Hydrobiol. Suppl. Bd.* 2, 809-50.

Eyes bare; wings with fine microtrichia clearly visible under a magnification of × 300, or even less, macrotrichia absent, anal lobe obtuse, squama with incomplete fringe of 2-6 hairs. Posterior fork well beyond r-m, R₂₊₃ distinct from R₄₊₅, Cu₁ bent in the middle, fork wide; An ending about opposite fork, costa produced. Pulvilli absent, empodium as long as claws, tibiae without long hairs.

I am following Edwards (1929) in the definition of this group, but I prefer to treat it as a full genus because the easily seen microtrichia combined with the obtuse anal angle and bent Cu₁ make it distinctive. Only one African species is known to me, which has been described previously by Kieffer, Goetghebuer and myself.

Limnophyes natalensis Kieffer

Camptocladius natalensis Kieffer, 1914, *Ann. S. Afr. Mus.* 10, 261.

Limnophyes brevis Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* 25, 203 (SYN. NOV.).

Limnophyes spinosa Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 206 (SYN. NOV.).

I have been able to borrow the holotype male of Kieffer's species and have found it to be an earlier description of my species *spinosa*. When I described *spinosa* I mentioned that Goetghebuer had described *brevis* from a mixed series including *spinosa* and that the type conformed to the other species. I have now been able to

examine his type series and can report that I was in error with regard to the identity of the type. Some specimens are faded and there are several specimens of other species in the series, including a species of *Metriocnemus*, which may account for Goetghebuer's statement that the shoulders were pale. This will also account for my error in 1953 because Dr. Benoit's examination rested largely on the colour of the thorax because Goetghebuer had not left a mount of the hypopygium.

The species is very close to *minima* Meigen from the Palaearctic Region and they may prove eventually to be identical. It is a little larger than *minima* and the antennal ratio is lower, segment 13 being three times as long as broad. Some of the specimens from the East African mountains have a higher A.R. and may either belong to a different species or may show that *natalensis* and *minima* are the same.

Male. Wing length 1.2–1.5 mm.

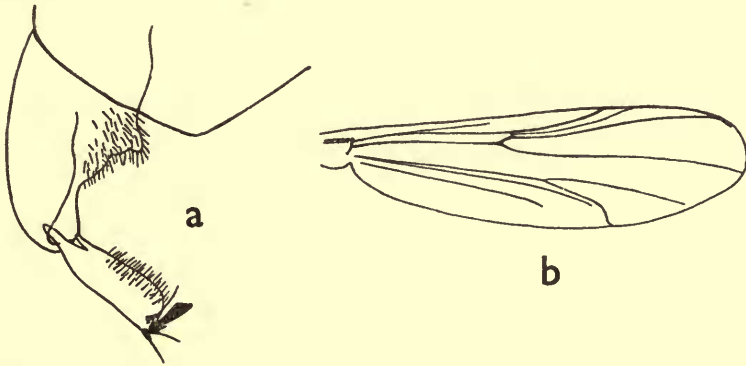


FIG. 12. *Limnophyes natalensis*. (a) Male hypopygium; (b) wing of male.

Head, mouthparts and antennae black, plumes black, A.R. 0.3–0.5 in most specimens, though some E. African specimens have a ratio of 0.8; segment 13 three times as long as broad. *Thorax* entirely black, slightly shining and pruinose especially on prescutellar area, dorso-central bristles dark and uniserial, no scales present. *Legs* brown, trochanters yellowish, L.R. 0.5, empodium well developed, pulvilli absent. *Wings* (Text-fig. 12, b) with well developed microtrichia, slightly greyish by transmitted light, Cu_1 strongly curved, squama with 2–5 hairs. Halteres dark. *Abdomen* dark brown; hypopygium (Text-fig. 12, a) without anal point, IXth tergite bare, style very similar to the Palaearctic species allied to *minima*, with inner margin bulbous, spine truncate and carried well at the apex.

Female quite similar to male.

Holotype male of *natalensis* in S. African Museum (Cape Province, Stellenbosch); holotype male and long series of paratypes of *brevis* in Musée Royal du Congo Belge (Belgian Congo, Kisantu); holotype male and paratypes of *spinosa* in British Museum (Cape Province, Kirstenbosch).

DISTRIBUTION. CAPE PROVINCE: series from Kirstenbosch, Assegaibos and Bergvliet (*K. M. F. Scott*). NATAL: 4 ♂, 2 ♀, Bushman's River, Estcourt, ix. 1953 (*A. D. Harrison*). TRANSVAAL: 5 ♂, 3 ♀, nr. Johannesburg, iv. 1955 (*A. D. Harrison*);

13 ♂, 12 ♀, Waterval, nr. Lydenburg iv. 1955 (*A. D. Harrison*). S. RHODESIA: 5 ♂, Salisbury iv. 1956 (*E. T. M. Reid*). BELGIAN CONGO: series from Parc Nat. Albert (*de Witte* and *de Wulf*); 1 ♀, Elisabethville, iii. 1939 (*H. J. Brédo*). UGANDA: 13 ♂, 5 ♀, Mt. Elgon, 9,500 ft., viii. 1934 (*J. Ford*); 10 ♂, 5 ♀, Ruwenzori Range, Namwamba V., 13,500 ft., xii. 1934 (*E. G. Gibbins*); 9 ♂, 2 ♀, Ruwenzori Range, Nyamgasani V., 11,000 ft., xii. 1934 (*D. R. Buxton*); 4 ♀, Kigezi Prov., Mt. Muhavura, 13,500 ft., xi. 1934 (*J. Ford*); 10 ♂, 2 ♀, Kigezi Prov., Mt. Sabinio, 11,000 ft., xi-1934 (*J. Ford*); 19 ♀, Kigezi Distr., Lake Mutamda, 6,000 ft., xi. 1934 (*J. Ford*). KENYA: 1 ♂, Aberdare Range, Nyeri Track, 11,000 ft., x. 1934 (*J. Ford*); 1 ♂, Aberdare Range, Mt. Kinangop, 10,000 ft., x. 1934 (*F. W. Edwards*). SUDAN: 1 ♀, Helwan, iii. 1923 (*S. Hirst*).

Genus *SMITTIA* Holmgren

Smittia Holmgren, 1869, *K. Svensk. Vet. Akad. Handl.* 8, 47; Goetghebuer, 1943, in Lindner, *Flieg. Pal. Reg.* 3 (13g), 77; Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 206.

Spaniotoma subg. *Smittia* Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 357.

Camptocladius van der Wulp, 1874, *Tijdschr. Ent.* 17, 133 (in part); Kieffer, 1918, *Ann. Mus. Nat. Hung.* 16, 76 (in part).

Allocladius Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 28 (SYN. NOV.).

Phaenocladius Kieffer, 1921 in Thienemann, *Arch. Hydrobiol. Suppl.* 2, 845.

Pseudosmittia Goetghebuer, 1932, *Faune de France* 32, 126; Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 208.

Euphaenocladius Thienemann, 1934, *Encycl. Ent. Dipt.* 7, 29.

Orthosmittia Goetghebuer, 1943, in Lindner, *Flieg. Pal. Reg.* 3 (13g), 110; Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 208.

Eyes bare or with very short pubescence; wings without distinguishable microtrichia, often rather milky; R_{2+3} ending separately in costa, posterior fork well beyond cross-vein, Cu often strongly curved; squama always quite bare; pulvilli usually absent.

The small species falling into this genus are best distinguished by the bare squama, a feature not found elsewhere except for occasional species of *Nanocladius* which can easily be separated on venational characters. I prefer to treat the group as a full genus and not to follow Edwards (1929) and treat it as a subgenus.

Edwards subdivided the British species of his subgenus *Smittia* into five species groups using as the key character the length of the anal vein. Goetghebuer (1943) made certain alterations to this arrangement and called the groups subgenera of the genus *Smittia*. The African species resemble Palaearctic species to a greater or lesser extent, but they do not all conform exactly to the grouping used by either Edwards or Goetghebuer, probably because the venational characters show more variety in the African species. The largest number of the species falls into Group E of Edwards, two species fall into Group A and three into Group D. There are others that do not seem to fall into any of the groups.

Goetghebuer took the species of Groups D and E together and redivided them as subgenera on the basis of the shape of Cu, whether it was straight or bent, calling them *Orthosmittia* and *Pseudosmittia* respectively. I am not very satisfied with this

grouping because it seems to place dissimilar species together, also *Orthosmittia* includes very few species.

I am of the opinion that Edwards' classification offers a basis for recognizing species groups, but that overlap and anomalous species blur the outlines of the groups. I do not, therefore, propose to recognize any subgenera and I am only using the species grouping of Edwards where possible to place the species that seem to be allied next to each other.

There is some evidence of a group not recognized by either Edwards or Goetghebuer, of species with a transverse fold beyond the end of the anal vein which gives the appearance of a spurious second posterior fork. This is also shown by at least six British species: *brevifurcata* Edwards, *trilobata* Edwards, *curticosta* Edwards, *conjuncta* Edwards, *forcipata* Goetghebuer, *contingens* Walker and by the Japanese species *bifurcata* Tokunaga. This group cuts across *Orthosmittia* and *Pseudosmittia* and is more favourable to Edwards' Groups.

Allocladius Kieffer, a genus described from an East African specimen said to be intermediate between the Orthoclaudiinae and Chironominae is an earlier description of *Pseudosmittia salti* Freeman. It has the coxite lobe in two well-formed free parts.

Euphaenocladus Thienemann has the same type species as *Phaenocladus* Kieffer and must fall as a synonym.

Kieffer described four species from Seychelles and five from the mainland which seem to be best placed in *Smittia* as shown in Table I (p. 292). I have seen the type of one mainland species but not of the other four, which were described from females. Of these, *Camptocladus guineensis* and *longicosta* both appear to be earlier descriptions of *Smittia longicostalis* Goetghebuer; *C. capensis* and *kribiensis* are unrecognizable, but probably belong to *Smittia*. Notes on these two are given below. Goetghebuer has described two species in *Smittia*, one being a redescription of a Kieffer species.

KEY TO AFRICAN SPECIES OF *Smittia*

(Includes only species of which I am certain and have seen specimens; based on males but can be used for some females.)

- | | |
|--|---------------------------------|
| 1. Eyes pubescent, anal vein reaching beyond fork | 2 |
| Eyes bare, anal vein not reaching beyond fork | 4 |
| 2. Wings with heavy dark markings (Text-fig. 13, <i>c</i>) | <i>maculipennis</i> Goetghebuer |
| Wings plain | 3 |
| 3. Anal lobe distinct in male (Text-fig. 13, <i>a</i>) | <i>atra</i> Freeman |
| Anal lobe obtuse | <i>fletcheri</i> sp. n. |
| 4. Wings with an extra transverse fold beyond apex of anal vein, running from Cu ₂ towards wing margin, forming an accessory posterior fork | 5 |
| Wings without this fold | 8 |
| 5. Cu ₁ strongly bent or curved (Text-figs. 13, <i>m</i> , <i>n</i>) | 6 |
| Cu ₁ practically straight (Text-figs. 13, <i>k</i> , <i>l</i>) | 7 |
| 6. A.R. 1-1, halteres black, costa longer (Text-fig. 13, <i>m</i>), hypopygium as in Text-fig. 14, <i>l</i> | <i>subtrilobata</i> sp. n. |
| A.R. 0-8, costa shorter, halteres white, hypopygium as in Text-fig. 14, <i>m</i> . | <i>hamata</i> sp. n. |
| 7. Shoulders of male with brilliant silvery pruinosity | <i>melanostola</i> Kieffer |
| Thorax of male all black | <i>hirtella</i> Freeman |

- | | |
|--|---------------------------|
| 8. Wings with anal lobe well formed in male, costa not produced | 9 |
| Wings without anal lobe in male | 11 |
| 9. Anal lobe very distinct (Text-fig. 13, <i>e</i>), coxite lobe right-angled | <i>rectilobus</i> Freeman |
| Anal lobe less distinct | 10 |
| 10. Coxite lobe very large and free (Text-fig. 13, <i>d</i>) wings smoky in both sexes | <i>nigra</i> Kieffer |
| Coxite lobe small and not free (Text-fig. 13, <i>f</i>) wings not smoky | <i>conigera</i> Freeman |
| 11. Anal vein strongly curved at apex, almost reaching wing margin (Text-fig. 13, <i>i</i>),
male style as in Text-fig. 14, <i>h</i> | <i>wulfi</i> sp. n. |
| Anal vein only slightly curved at apex | 12 |
| 12. Body yellow with black markings on stripes and abdominal segments 2, 3, 5 and 8 | <i>harrisoni</i> sp. n. |
| Body black, though abdominal sternites sometimes paler | 13 |
| 13. R ₄₊₅ ending at level of apex of M ₃₊₄ | 14 |
| R ₄₊₅ ending before this level | 15 |
| 14. Thorax brown and not very shining, species from Seychelles | <i>mahensis</i> Kieffer |
| Thorax black and slightly shining | <i>subnigra</i> nom. nov. |
| 15. A.R. only about 0.2, anal point long, ♀ not known | <i>capicola</i> Freeman |
| A.R. 0.7, anal point absent; costa of female greatly produced, antennae with flask-
shaped segments | <i>guineensis</i> Kieffer |

Smittia atra Freeman

Smittia atra Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) **23**, 175.

A typical member of Edwards' Group B, doubtfully distinct from the Palaearctic species *aterrima* Meigen, style without such a large projection. Quite black, thorax rather shining, eyes with short pubescence, costa produced, Cu₁ bent, anal lobe distinct, female antennae with intermediate segments moniliform.

Male. Wing length 1.8 mm.

Head, mouthparts, and antennae black, A.R. about 1.5, eyes with distinct but short pubescence. *Thorax* all black, slightly shining and with some pruinosity. *Legs* dark brown, L.R. 0.6, pulvilli absent, empodium well developed. *Wings* milky, venation as in Text-fig. 13, *a*, costa clearly produced, r-m short, Cu₁ bent, An reaching beyond posterior fork, anal lobe distinct but not large. Halteres dark brown. *Abdomen* blackish, hypopygium (Text-fig. 14, *a*) with bare anal point, IXth tergite with a few hairs, style with inner flange present but less developed than in *aterrima* Meigen.

Female similar to male, antennae with intermediate segments moniliform.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: type series, Berg River, iv-v.1953 (*K. M. F. Scott*). BELGIAN CONGO: 1 ♂, Lulenga (*de Wulf*) in Musée Royal du Congo Belge. UGANDA: 1 ♂, Kigezi Distr., Lake Mutamda, 6,000 ft., xi.1934 (*J. Ford*); 1 ♂, Kigezi Prov., Mt. Sabinio, 11,500 ft., xi.1934 (*J. Ford*). ETHIOPIA: 15 ♂, 16 ♀, Addis Ababa, iv.1936 (*J. W. S. Macfie*).

Smittia fletcheri sp. n.

Eyes pubescent; body entirely black, squama and halteres white; anal lobe of wing rounded and obtuse; male hypopygium characteristic. Similar to *atra* but easily separated by shape of male style and anal point, also by reduced wing lobe; it belongs to Edwards' Group B although it is not completely typical.

Male. Wing length 1.5 mm.

Head, mouthparts, antennae and plumes black, eyes with short but distinct pubescence, A.R. about 1.4. *Thorax* black, not as shining as *atra*, pruinose. *Legs* dark brown, L.R. 0.6, pulvilli absent, empodium present. *Wings* whitish, squama white, anal lobe reduced (Text-fig. 13, *b*), venation very similar to *atra*. Halteres white. *Abdomen* blackish, hypopygium (Text-fig. 14, *b*) with broad, bare anal point and well formed coxite lobe; style with broad median expansion giving a triangular appearance.

Female not known.

Holotype male UGANDA: Ruwenzori Range, Mahoma River, 6,700 ft., viii. 1952 (D. S. Fletcher) in British Museum.

Smittia maculipennis Goetghebuer

Smittia maculipennis Goetghebuer, 1936, *Rev. Zool. Bot. Afr.* 28, 492.

Readily distinguished from all other African species known to me by the heavy bluish black markings on the wings; eyes pubescent, anal vein extending just beyond fork, placing it in Edwards' Group B.

Male not known.

Female. Wing length 1.0 mm.

Head black, antennae rather paler, segments 3-5 oval, 6 nearly as long as 4-5 together, eyes with short pubescence. *Thorax* velvety black or dark brown. *Legs* yellowish brown, pulvilli absent, L.R. 0.5. *Wings* (Text-fig. 13, *c*) heavily marked with bluish black as shown; Goetghebuer's figure is inaccurate, because the anal spot is not discrete, but has a ragged edge and is hardly separated from the main spot; in some specimens the two are fused; costa strongly produced, Cu_1 bent, An ending just beyond fork. Halteres white. *Abdomen* black.

I have seen the holotype female which is in Musée Royal du Congo Belge.

DISTRIBUTION. BELGIAN CONGO: holotype, N. Kivu, Kibati, xi-xii. 1933 (*de Wulf*); 2 ♀, Envir. Mission Rugari, Lulenga (*de Wulf*) in Mus. R. du Congo Belge; 1 ♀, Elizabethville, xii. 1938 (*H. J. Brédo*) in Inst. R. des Sciences naturelles de Belgique. KENYA: 6 ♀, Muguga, x. 1953 (*V. F. Eastop*).

Smittia nigra Kieffer

Allocladius niger Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1, 28.

Pseudosmittia salti Freeman, 1954, *Arch. Hydrobiol.* 48, 442 (SYN. NOV.).

In his original description Kieffer states that the anal point was absent. I have been able to examine the type and can say that a broad anal point is present.

Completely black, eyes bare, wings smoky especially in female, costa not produced, Cu_1 slightly bent, An not reaching beyond fork; male coxite lobes long and free; falls into Edwards' Group D.

Male. Wing length 1.5-1.6 mm.

Head, mouthparts and antennae black, A.R. 0.9, eyes bare. *Thorax* black, slightly pruinose, hardly shining, bristles black. *Legs* black and with black hairs, L.R. 0.5, pulvilli absent, empodium well developed. *Wings* (Text-fig. 13, *d*) rather dark,

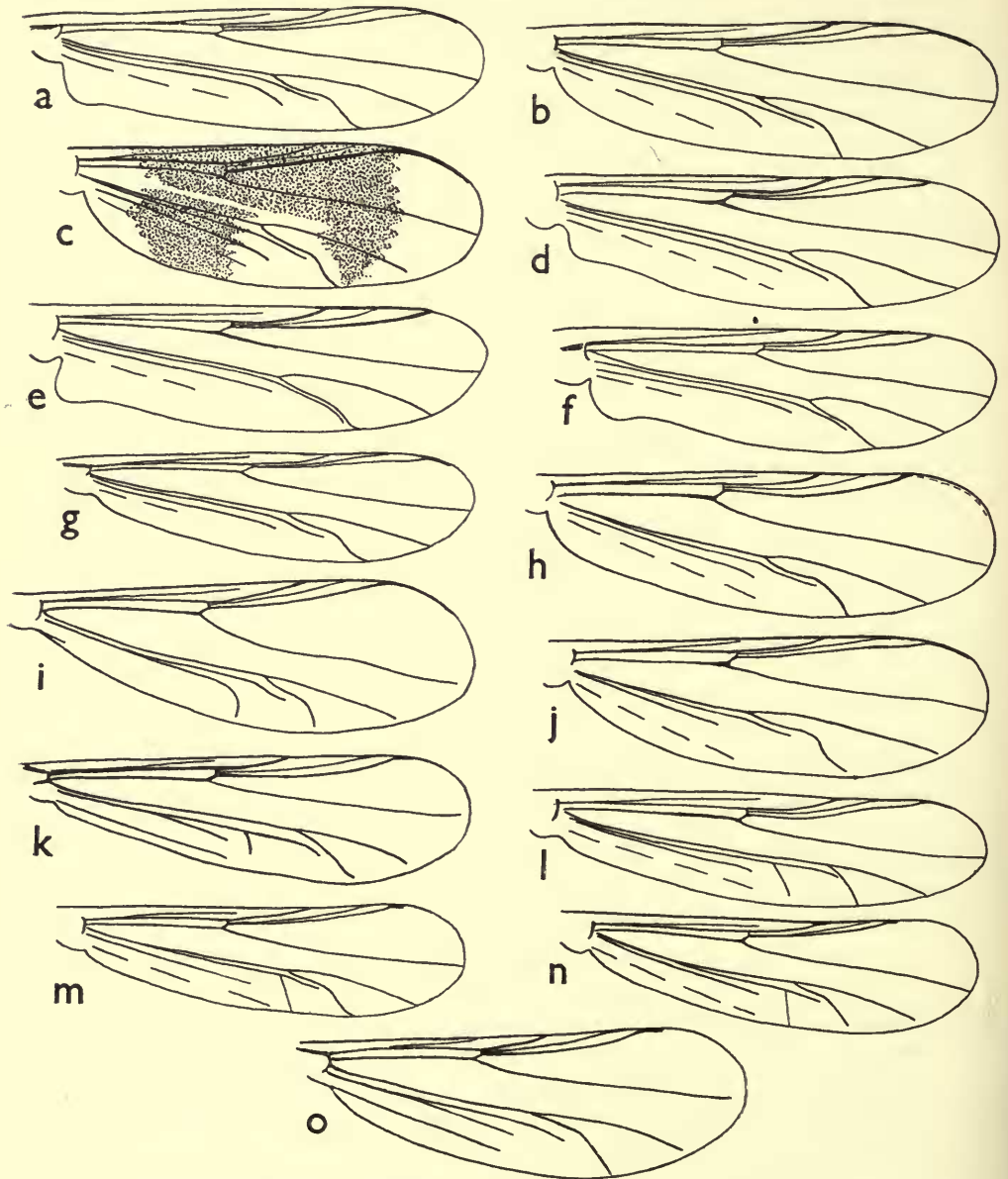


FIG. 13. Wings of *Smittia*, all males except for (c). (a) *S. atra*; (b) *S. fletcheri*; (c) *S. maculipennis*; (d) *S. nigra*; (e) *S. rectilobus*; (f) *S. conigera*; (g) *S. subnigra*; (h) *S. guineensis*; (i) *S. wulfi*; (j) *S. harrisoni*; (k) *S. hirtella*; (l) *S. melanostola*; (m) *S. subtrilobata*; (n) *S. hamata*; (o) *S. capicola*.

greyish or slightly smoky, costa not produced, Cu slightly bent, An ending just before or opposite fork, lobe present but not large. Halteres black. *Abdomen* black; hypopygium (Text-fig. 14, *c*) with well developed hairy anal point arising rather basally on tergite which has a few hairs; inner lobe of coxite in two parts, lower one free and large. In the holotype of *salti* the lower lobe is broad and racket-shaped but there is some variation in the exact, shape and other specimens may have it a good deal narrower.

Female very similar to male, segments 3-5 of antenna oval, last segment equal to two preceding together; wings darker, quite dark grey in one specimen, costa longer, possibly slightly produced; ending beyond apex of M_{3+4} .

Holotype male of *nigra* in Muséum National d'Histoire Naturelle, Paris; of *salti* in British Museum.

DISTRIBUTION. KENYA: holotype male of *nigra*, Mt. Kenya, 2870 m., i.1912 (*Alluaud et Jeannel*); paratype males of *salti*, Aberdare Range, Nyeri Track, 10,500-11,000 ft., x.1934 (*J. Ford*). UGANDA: 1 ♂, Kigezi Distr., Lake Mutanda, 6,000 ft., xi.1934 (*J. Ford*). TANGANYIKA: holotype male and paratype female of *salti*, Kilimanjaro, Shira Plateau, 12,100 ft., xi.1948 (*G. Salt*). BELGIAN CONGO: 1 ♀, Parc Nat. Albert, Nyiragongo, 2,300 m. (*de Wulf*) in Mus. Roy. du Congo Belge.

Smittia rectilobus Freeman

Pseudosmittia rectilobus Freeman, 1955, *S. Afr. Animal Life*. Uppsala, 2, 252.

Body completely black, halteres black, costa not produced, Cu bent, An ending opposite fork, anal lobe of wing large. Falls into Edwards' Group D.

Male. Wing length 1.5 mm.

Head black, eyes bare, plumes dark, A.R. about 1.7. *Thorax* black and slightly shining *Legs* dark brown, L.R. 0.6. *Wings* (Text-fig. 13, *e*) milky, lobe prominent, costa not produced, Cu_1 slightly bent. Halteres blackish. *Abdomen* black; hypopygium (Text-fig. 14, *d*) quite characteristic; anal point short and hairy basally, inner coxite lobe right-angled or slightly more produced; style somewhat bent upwards at apex.

Female not known.

Holotype male in South African Museum, Cape Town.

DISTRIBUTION. CAPE PROVINCE: holotype ♂, and 14 ♂ paratypes, Stellenbosch, x.1917 (*Lightfoot*); 7 ♂ paratypes Cape Peninsular xi.1950 (*P. Brinck*). TRANSVAAL: 1 ♂, Assegai River, ix.1953 (*A. D. Harrison*); 1 ♂ Pongola Settlements ix.1954 (*A. D. Harrison*); 1 ♂, Amsterdam, Gt. Usutu River, ix.1954 (*A. D. Harrison*). S. RHODESIA: 1 ♂, Salisbury, iv.1956 (*E. T. M. Reid*). UGANDA: 1 ♂, Kigezi Distr., Mt. Mgahinga, 11,000 ft., xi.1934 (*F. W. Edwards*); 1 ♂, Mt. Elgon, 8,000 ft., viii.1934 (*J. Ford*).

Smittia conigera Freeman

Pseudosmittia conigera Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) 23, 176.

Entirely black or dark brown, thorax slightly shining, costa not produced, posterior fork rather wide, Cu slightly bent, An short, anal lobe present. Falls into Edwards'

Group D, best separated from previous two species by shape of coxite lobes of male.

Male. Wing length 1.5 mm.

Head, mouthparts and antennae black, A.R. about 1.6, eyes bare. *Thorax* black, slightly shining and pruinose. *Legs* dark brown, L.R. 0.5; pulvilli absent, empodium well developed. *Wings* (Text-fig. 13, *f*) milky; costa not produced, posterior fork fairly short and wide, Cu slightly bent, An not reaching fork; anal lobe well marked. Halteres black. *Abdomen* blackish, hypopygium (Text-fig. 14, *e*) with widely conical and short anal point, IXth tergite and point with scattered hairs, style rather foreshortened in the figure and with slight inner flange, coxite lobe small.

Female very similar to male, as in *nigra* the costa is longer; distinguished from *nigra* by the paler wings.

Holotype male in British Museum, type locality, Cape Province, Berg River, Piquetberg.

DISTRIBUTION. CAPE PROVINCE: type series (4 ♂), Berg River, xii.1952–iii.1953 (*K. M. F. Scott*). NATAL: 1 ♂, Bushman's River, ix.1953 (*A. D. Harrison*). TRANSVAAL: 2 ♂, Olifants River, Loskoop Dam, v.1955 (*A. D. Harrison*). BELGIAN CONGO: 13 ♂, 2 ♀, Parc Nat. Albert xii.1934–i.1935 (*de Witte*); 1 ♂, Lulenga (*de Wulf*) in Mus. Roy. du Congo Belge. ETHIOPIA: 9 ♂, nr. Addis Alleme, c, 8,000 ft., ix.1926 (*J. Omer Cooper*); 1 ♂, Koram, iii.1936 (*J. W. S. Macfie*).

Smittia subnigra nom. nov.

Smittia nigra Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 206 (not Kieffer, 1913—see above).

This species does not fit easily into any of Edwards' groups. It cannot be placed in Group B because of the shortness of the anal vein and is precluded from D by the produced costa and absence of anal lobe; the conformation of the costa is unlike Group E.

Quite black in both sexes; A.R. about 1.3, L.R. 0.75; costa produced, Cu bent, anal lobe absent; anal point of male short and hairy.

Male. Wing length 1.1–1.4 mm.

Head, mouthparts and antennae with plumes black; eyes bare, A.R. 1.3. *Thorax* quite black, slightly shining and with some pruinosity. *Legs* dark brown or blackish, L.R. about 0.75, pulvilli absent. *Wings* (Text-fig. 13, *g*) milky, costa well produced, posterior fork beyond r–m, Cu bent, An ending slightly before fork, anal angle obtuse. Halteres black. *Abdomen* black; hypopygium (Text-fig. 14, *f*) with short rounded and hairy anal point, IXth tergite with some hairs immediately around anal point; coxite with small inner lobe, style rather curved and without flange.

Female. There are some specimens doubtfully determined as this species: very similar to male, but with costa strongly produced, much more so than in male; antenna with intermediate segments fusiform, last segment one and a half times as long as penultimate.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype ♂, 2 ♂ paratypes x.1952 and 5 ♂, v.1953, Berg River, French Hoek Forest Reserve; 3 ♀, Bergvliet, x.1952 (all coll. *K. M. F. Scott*).

Smittia mahensis Kieffer

Dactylocladius mahensis Kieffer, 1911, *Trans. Linn. Soc. Lond. (Zool.)* **14**, 361.

Described from a single male gummed on its side on to a piece of card. It is now lacking one wing and the hypopygium; the other wing is gummed down and is partly hidden by the other parts of the specimen. The following description is as complete as possible, but more material will be necessary from the type locality before a full diagnosis can be given. Kieffer's figure of the hypopygium is diagrammatic and useless for recognition purposes; he did not preserve the mount.

A brownish black insect with paler shoulders (? faded), costa produced, R_{4+5} ending at same level as M_{3+4} ; An ending just before posterior fork. It does not fit readily into any of Edwards' groups.

Male. Wing length about 1.0 mm.

Head, mouthparts, antennae brownish yellow, eyes bare, A.R. 0.9, antennae with 13 or 14 segments, not 12 as stated by Kieffer. *Thorax* brown, shoulders yellowish. *Legs* brownish, pulvilli absent, anterior tarsi broken. *Wings* pale, squama bare, anal angle rounded, similar to *fletcheri* (Text-fig. 13, *b*); venation very similar to that species except that r-m is longer and anal vein ends just before the fork. Halteres pale. *Abdomen* dark brown, hypopygium missing and impossible to describe from Kieffer's figure.

Holotype male in British Museum.

DISTRIBUTION. Known only from the type, SEYCHELLES: Mahé, Anonyme I., i. 1909 (*J. S. Gardiner*).

Smittia guineensis Kieffer

Camptocladius guineensis Kieffer, 1918, *Ann. Mus. nat. Hung.* **16**, 81.

Camptocladius longicosta Kieffer, 1923, *Ann. Soc. ent. France* **92**, 185 (SYN. NOV.).

Smittia longicostalis Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* **25**, 204 (SYN. NOV.).

All three species synonymized here were described from the female. This species is peculiar in the female because of the unusual length of the antennae with their flask-shaped segments, also the costa is greatly produced and R_{4+5} ends basal to the level of the tip of M_{3+4} . All these points are mentioned in Kieffer's descriptions and I am quite satisfied that they are both earlier descriptions of Goetghebuer's species, of which I have seen the type. Kieffer states that in *longicosta* the stripes are separate, but spirit specimens are usually much paler than pinned ones. I am fairly certain that I have been able to identify the male, even though the costa is not clearly produced, because of the width of the radial cell and the general appearance. I have examined the single remaining type specimen of *longicostalis* and am unable to see the pubescent eyes mentioned by Goetghebuer, who also overestimated the leg ratio.

Thorax matt black, eyes bare, A.R. 0.7; costa not clearly produced in the male, strongly produced in the female, Cu_1 bent, anal vein ending opposite fork, anal lobe reduced; female antenna with flask-shaped intermediate segments. It seems to fall between Groups D and E of Edwards' classification.

Male. Wing length 1.1 mm.

Head and mouthparts black, pedicel black, flagellum and plumes whitish, A.R. 0.7, eyes bare. *Thorax* matt black, mesonotum rather browner centrally. *Legs* pale brown, pulvilli absent, L.R. 0.4. *Wings* very glassy in appearance, anal lobe obtuse (Text-fig. 13, *h*); costa not clearly produced, but wing margin slightly thickened as shown; R_1 and R_{4+5} widely separated, the latter ending just basal to M_{3+4} , Cu_1 bent, An ending opposite fork. Halteres brownish yellow. *Abdomen* black; hypopygium (Text-fig. 14, *g*) simple, IXth tergite lacking point but hairy at apex, coxite lobe reduced, style curved.

Female dark brown, matt, distinguished from other African species known to me by the longer antennae, segments 2-5 being flask-shaped, 3-5 with stem as long as basal bulb, 6 as long as 4 and 5 together. Wings slightly brown tinged, costa strongly produced for the distance of the slight thickening of the male, remainder of venation as in male.

I have seen the holotype female of *longicostalis* in Musée Royal du Congo Belge. The type specimen of *guineensis* was not preserved by Kieffer with the remainder of the collection described at the same time, and together with that of *longicosta* must be presumed lost.

DISTRIBUTION. FRENCH GUINEA: Mamon (type locality of *guineensis*). FRENCH CAMEROONS: Kribi (type locality of *longicosta*). BELGIAN CONGO: type ♀ of *longicostalis*, Kisantu; 1 ♀, Rutshuru, i. 1934 (*de Wulf*); 1 ♂, 5 ♀, Envir. Mission Rugari, Lulenga (*de Wulf*); 1 ♀, Parc Nat. Albert, cratère Muganga (*de Wulf*)—all from coll. of Musée Royal du Congo Belge.

Smittia wulfi sp. n.

Distinguished from all other African species known to me by the long strongly curved anal vein which nearly reaches the wing margin basal to level of posterior fork. Costa strongly produced, style of male hypopygium with two rows of bristles, palpi reduced, A.R. 0.4; it does not fit easily into any of Edwards' Groups.

Male. Wing length 1.0 mm.

Head brown, mouthparts yellowish, palpi reduced, each segment about one and a half times as long as broad, eyes bare. Antennal plumes reduced in number, free segments fusiform, apical segments short so that A.R. is only about 0.4. *Thorax* brown, shoulders yellow. *Legs* yellowish, L.R. 0.5, pulvilli absent. *Wings* (Text-fig. 13, *i*) clear, anal lobe absent, An long and curved, nearly reaching wing margin but not passing posterior fork, costa strongly produced, Cu bent. Halteres brownish. *Abdomen* dark brown, hypopygium very characteristic (Text-fig. 14, *h*); anal point absent, represented by a small hairy lobe, coxite lobes as shown, the more apical one with a small tuft of curved hairs; style with a basal group of strong hairs or bristles and a row of smaller ones along its length.

Female not known.

Holotype male BELGIAN CONGO: Envir. Mission Rugari, Lulenba, 1933 (*de Wulf*) in Musée Royal du Congo Belge.

Smittia harrisoni sp. n.

A distinctive species, yellow with dark markings on thorax and on abdominal segments 2, 3, 5 and 8; A.R. 0.6, eyes bare, costa produced, Cu bent, An short, anal lobe absent, knees black. It presumably falls into Edwards' Group E.

Male. Wing length 1.1 mm.

Head and mouthparts yellow, antennae brownish, A.R. 0.6, eyes bare. *Thorax* yellow with brown markings forming a circle around prescutellar area, i.e. two small marks on central stripes, lateral stripes largely brown, wing bases and base of scutellum brown, postnotum dark. *Legs* yellow, apices of femora, bases and apices of tibiae black, pulvilli absent, L.R. 0.75. *Wings* dark basal to arculus, costa strongly produced (Text-fig. 13, *j*), Cu₁ well bent, An short, anal lobe obtuse. Halteres yellow. *Abdomen* yellow, segments 2, 3, 5 with apical third and lateral margins black, segment 8 wholly black. Hypopygium simple (Text-fig. 14, *i*). anal point broad and bare, coxite lobe small, style without flange.

Female with coloration similar to male except for abdomen, which is darker with pale areas less conspicuous; antennal segments 3-5 fusiform.

Holotype male and 6 ♂, 1 ♀, paratypes, TRANSVAAL: Mica-Gravelotte Road, 6.v.55; 1 ♂, Kruger National Park, Skukuza, Sabie River, 5.v.55 (*A. D. Harrison*). SUDAN: 3 ♂, 1 ♀, Wau, x.1952 (*E. T. M. Reid*). Holotype and 9 paratypes in British Museum, 3 paratypes placed in South African Museum.

Smittia hirtella Freeman

Orthosmittia hirtella Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 208.

A small species, male all black, female more yellowish with separate black scutal stripes; transverse fold present beyond apex of anal vein, posterior fork short, Cu₁ straight; the only other African species known to me with straight Cu₁ comes from Seychelles (*melanostola*). This species falls into Edwards' Group E and *Orthosmittia* Goetghebuer.

Male. Wing length 1.0 mm.

Head and pedicel black, palpi and flagellum brown, plumes black, A.R. about 0.9, eyes bare. *Thorax* black. *Legs* brown, empodium well developed, pulvilli absent, L.R. 0.5. *Wings* milky, venation as in Text-fig. 13, *k*, costa produced, R₄₊₅ ending before level of apex of M₃₊₄, posterior fork short and distal, Cu₁ straight; An short, transverse fold present giving appearance of double posterior fork, but not as well developed as in *melanostola*; anal lobe absent. Halteres black. *Abdomen* black; hypopygium (Text-fig. 14, *j*) with long bare anal point, inner lobe of coxite nearly right-angled.

Female. Smaller than male, wing length 0.7-0.8 mm. Head, scape, mouthparts yellowish, flagellum brown; last antennal segment equal to preceding two together. *Thorax* yellowish, mesonotum with three separate dark brown stripes, postnotum and sternopleuron dark brown. Costa more strongly produced, abdomen black on tergites, sternites pale, cerci brown.

Holotype male in British Museum.

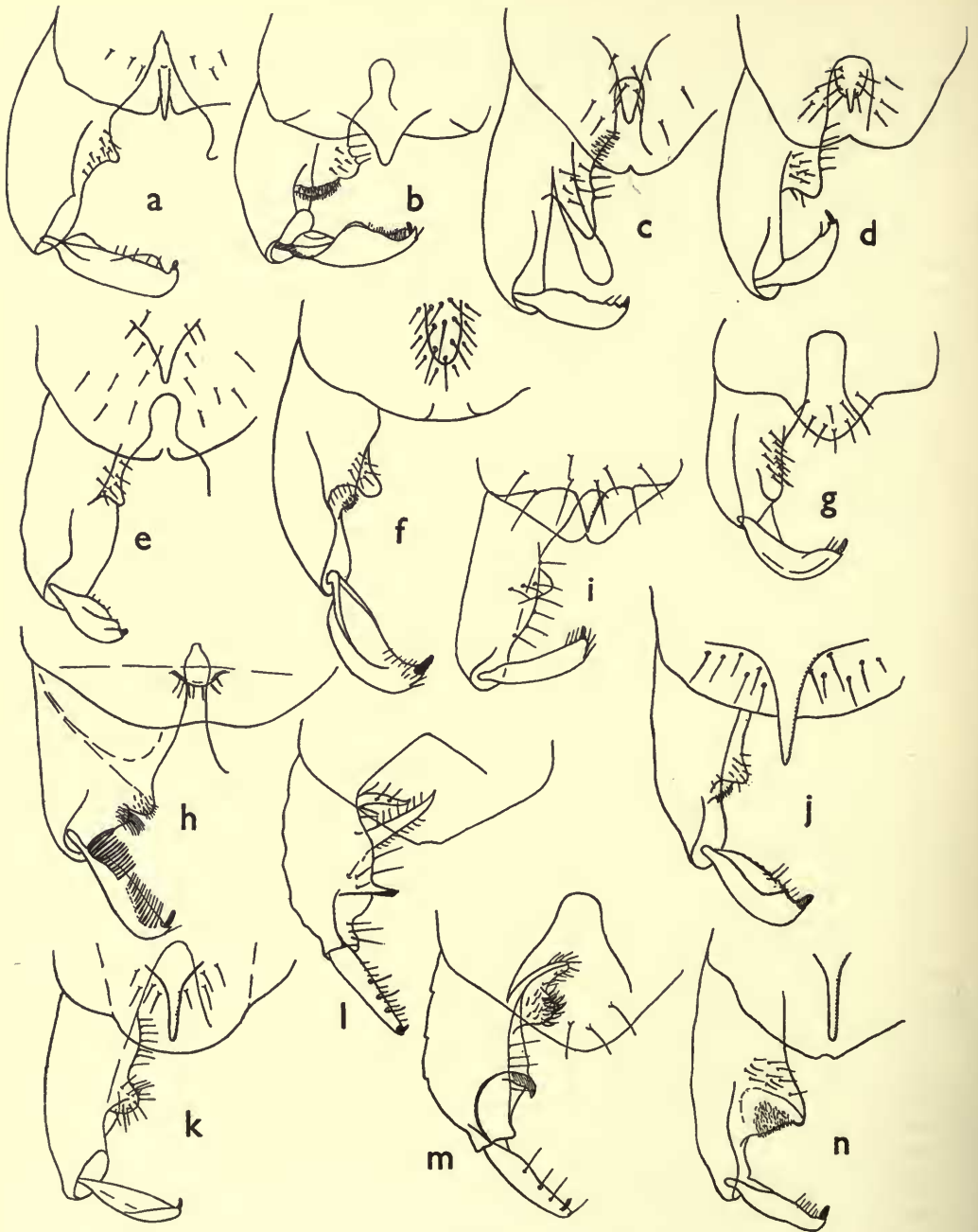


FIG. 14. Male hypopygia of *Smittia*. (a) *S. atra*; (b) *S. fletcheri*; (c) *S. nigra*; (d) *S. rectilobus*; (e) *S. conigera*; (f) *S. subnigra*; (g) *S. guineensis*; (h) *S. wulfi*; (i) *S. harrisoni*; (j) *S. hirtella*; (k) *S. melanostola*; (l) *S. subtrilobata*; (m) *S. hamata*; (n) *S. capicola*.

DISTRIBUTION. CAPE PROVINCE: holotype male and 1 ♂, 3 ♀, Zeekoe Vlei, xi.1952 (*K. M. F. Scott*). TRANSVAAL: 1 ♂, Nelspruit, Crocodile River, ix.1954 (*A. D. Harrison*). NATAL: 2 ♂, mouth of Tugela River, v.1954 (*W. D. Oliff*). NYASALAND: 1 ♂, Mlanje, v.1913 (*S. A. Neave*).

Smittia melanostola Kieffer

Dactylocladius melanostolus Kieffer, 1911, *Trans. Linn. Soc. Lond. (Zool.)* 14, 362.

Dactylocladius xanthostolus Kieffer, 1911, *Ibid.*, 362 (SYN. NOV.).

Dactylocladius heterostolus Kieffer, 1911, *Ibid.*, 363 (SYN. NOV.).

Structure quite similar to *hirtella*, but easily distinguished by the brilliant silvery pruinose shoulders of the male; wings brown tinged, white basal to arculus, A.R. 1.0. The females were described by Kieffer as two separate species, but their wing venation and general appearance show them to be not only the same species as each other but also the same as the males. He is wrong in saying that the anterior tibia of *heterostolus* is only one and a half times as long as the basitarsus: measurements show it to be exactly twice as long, which is the ratio he gives for *xanthostolus*.

Male. Wing length 1.3 mm.

Head, mouthparts and antennae dark brown, eyes bare, A.R. about 1.0. *Thorax* dark brown, matt, shoulders yellow and with brilliant silvery pruinosity. *Legs* yellowish brown, pulvilli absent, L.R. 0.75. *Wings* slightly brown tinged, white basal to arculus, venation (Text-fig. 13, *l*) quite similar to *hirtella*, but costa more produced, posterior fork shorter, accessory fork better developed. *Abdomen* dark brown; hypopygium (Text-fig. 14, *k*) again quite similar to *hirtella*, anal point smaller, style narrower.

Female. Shoulders lacking pruinosity, antennae with segments 3-5 slightly flask-shaped, last segment rather longer than preceding two together, otherwise quite similar to male.

Type specimens of all three species in British Museum.

DISTRIBUTION. Known only from type locality, SEYCHELLES: Mahé; 3 ♂, *melanostolus*, Cascade Estate iii.1909; 3 ♀ *xanthostolus* and 1 ♀ *heterostolus* Anonyme I., from seaweed, i.1909.

Smittia subtrilobata sp. n.

This species is hardly to be distinguished from the Palaearctic species *trilobata* Edwards. The differences lie in the greater reduction of anal lobe, the clearer wings, the slightly produced costa and the slightly differently shaped coxite lobes.

Totally black, at least in male, A.R. 1.1, wings with accessory posterior fork, Cu_1 bent, male coxite with three narrow inner lobes or appendages, styles rigid or probably so.

Male. Wing length 1.0 mm.

Head, mouthparts, antennae and plumes black, eyes bare, A.R. 1.1. *Thorax* totally black, slightly shining. *Legs* dark brown, L.R. 0.7, pulvilli absent. *Wings* clear, venation as in Text-fig. 13, *m*, accessory posterior fork present, Cu_1 bent,

costa slightly produced. Halteres black. *Abdomen* black; hypopygium (Text-fig. 14, *l*) without anal point, coxite with three inner appendages as shown, narrower at its extremity so that style is probably rigid; style tapered and with a few longer hairs along its length, single small apical spine present.

Female not known.

Holotype male, TRANSVAAL: Gladdespruit, nr. Badplaats, ix. 1954 (*A. D. Harrison*) in British Museum.

Smittia hamata sp. n.

Quite similar to *subtrilobata* in appearance, but differs in shape of coxite lobes, also halteres white and apical antennal segment shorter, female with separate scutal stripes.

Male. Wing length 0.8 mm.

Head, mouthparts and antennae blackish, eyes bare, A.R. 0.8. Thorax quite black, slightly shining. *Legs* brown, L.R. 0.7, pulvilli absent. *Wings* clear, whitish by reflected light, anal lobe greatly reduced, venation as in Text-fig. 13, *n*, accessory posterior fork present, Cu_1 bent, costa more retracted than *subtrilobata*; halteres white or yellow. *Abdomen* black; hypopygium (Text-fig. 14, *m*) of same general structure as *subtrilobata*, but coxite lobes only two in number and not as elongate, apical one hooked; style very similar.

Female with separate scutal stripes, background yellow, very similar to female of *hirtella*, but distinguishable by the longer posterior fork.

Holotype male and paratypes 1 ♂, 5 ♀, TRANSVAAL: Kruger National Park, Skukuza, Sabie River, v. 1955 (*A. D. Harrison*); 1 ♂, Mica-Gravelotte Road, v. 1955 (*A. D. Harrison*); 1 ♂, Nelspruit, Crocodile River, ix. 1954 (*A. D. Harrison*). Three paratypes placed in South African Museum, remainder of series in British Museum.

Smittia capicola Freeman

Pseudosmittia capicola Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 208.

A small black species belonging to Edwards' Group E, lacking accessory posterior fork, Cu_1 bent, costa retracted and produced; A.R. very short, only 0.2.

Male. Wing length 1.0 mm.

Head, mouthparts and antennae black, last flagellar segment short, hardly longer than preceding two together, A.R. 0.2, eyes bare. *Thorax* completely black and slightly shining. *Legs* dark brown, L.R. 0.6, pulvilli absent. *Wings* milky, venation (Text-fig. 13, *o*) with costa produced, but well retracted, Cu_1 bent, An not reaching fork, anal lobe reduced. Halteres black. *Abdomen* black; hypopygium (Text-fig. 14, *n*) with well developed bare anal point arising rather basally on the tergite; inner lobe of coxite large and of characteristic shape, style narrow and with large spine.

Female not known.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype and 3 ♂, x. 1952, and 3 ♂, iv. 1953, Berg River, French Hoek Forest Reserve (*K. M. F. Scott*).

? *Smittia capensis* Kieffer

Camptocladius capensis Kieffer, 1914, *Ann. S. Afr. Mus.* **10**, 261.

The type of this species is not to be found in the South African Museum with the others described in the same paper and must be presumed lost. From the description it may be a species of *Smittia*, but identification of the species is impossible. The following account is taken from the original description.

Male. Totally black; A.R. 1.5; wing membrane without microtrichia, costa not produced, ending a little basal to level of apex of M_{3+4} , posterior fork well distal to r-m, Cu_1 bent in its distal half; legs with long hairs, pulvilli absent. Length 2.2 mm. Type locality, Cape Town.

? *Smittia kribiensis* Kieffer

Camptocladius kribiensis Kieffer, 1923, *Ann. Soc. ent. France* **92**, 186.

This species, described from a female in spirit is unrecognizable and is placed here in some doubt; the type is almost certainly lost. The following is taken from the original description.

Female. Length 0.8 mm.

Colour yellowish white, mesonotal stripes, sternopleuron and postnotum brownish, halteres white. Eyes bare, antennae brownish, of six segments, 3-5 flask-shaped and with necks hardly longer than thick, segment 6 nearly twice as long as 5. Wings without distinguishable microtrichia, gradually narrowed towards the base; R_{4+5} reaching costa more or less at level of apex of M_{3+4} , costa produced for a distance equal to twice length of cross-vein, posterior fork well distal to cross-vein, Cu_1 feebly bent in its distal half. Legs brownish, L.R. 0.5. Abdomen with brownish incisures, cerci white.

Type locality FRENCH CAMEROONS: Kribi.

Smittia sp. incert.

Among the material sent to me at various times from Cape Province, French Hoek Forest Reserve, by Dr. K. M. F. Scott, there are females of a species of *Smittia* in which in most specimens there are macrotrichia on the lower surface of vein M_{1+2} . The thorax is yellow with black stripes, Cu_1 is bent and the anal vein just passes the posterior fork. However, in some specimens which are in other respects identical, there are no traces of macrotrichia on this vein, whilst others may have as many as ten. I do not feel justified in describing this species from the female alone when this unusual character is subject to such wide variation.

Genus *KNEPPERIA* Kieffer

Knepperia Kieffer, 1908, *Denkschr. Med. Naturw. Ges. Jena* **13**, 155.

The following definition is taken from the original: eyes bare, not narrower above; palpi long and four segmented; antennae, head and thorax as in *Chironomus*. Wing membrane bare, with fine and close punctures; R_{4+5} ending as far from the wing tip as Cu_1 . No clear pulvilli or empodium. Hypopygium as in *Chironomus*

i.e. with lower pubescent and upper bare, inner appendages to the coxite, but instead of one there are two bare upper processes.

There was one included species, *K. gracilis* Kieffer. This has Orthoclaudiine spurs on the tibia and a peculiar male hypopygium. I am reproducing Kieffer's figures (Text-fig. 15) of wing venation and hypopygium to aid identification. The type specimens are not in Zoologische Museum, Berlin, and must be presumed lost. Length 2.5 mm.

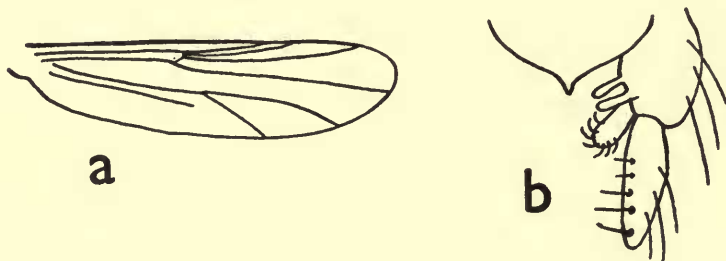


FIG. 15. *Knepperia gracilis* (after Kieffer, 1908). (a) wing; (b) male hypopygium.

Knepperia is almost certainly an Orthoclaudiine genus, but it is difficult to say from Kieffer's description whether it is a peculiar genus or whether the description is simply a poor description of an already known genus. The hypopygium bears some resemblance to species of *Cardiocladius*, but the absence of anal lobe to the wing precludes that. There is also a resemblance to the species of *Smittia* near *S. subtrilobata* sp. n., but the size is too great for that. Exact identification will have to wait further collecting in the type locality.

Type locality, SOUTH WEST AFRICA: Rooibank, v. 1905.

SUBFAMILY CORYNONEURINAE

Edwards (1929) treated all the species of this subfamily as species of one genus, *Corynoneura*, in the subfamily Orthoclaudiinae; he recognized two subgenera. The venation is very distinctive and the group so readily recognized that I prefer to follow Goetghebuer (1932, *Faune de France* 23, 131) and treat them as forming a separate subfamily which may be defined as follows.

R_1 and R_{4+5} entirely fused with one another and almost entirely fused with the thickened costa to form a "clavus", which extends less than half the wing length in the male and not more than two-thirds of the wing length in the female; a false vein runs from r-m below the clavus and then close to the wing margin almost as far as the wing tip; wing membrane without macrotrichia or microtrichia, anal lobe of wing usually absent; squama bare; fourth tarsal segment shorter than the fifth and often more or less heart-shaped; male antenna with 10-13 segments; very small species, wing length less than 2 mm.

There is an interesting feature in the structure of the male hypopygium. The internal struts are larger than usual and exhibit specific differences throughout the subfamily; their greatest development is in *Corynoneura*. Here the transverse

struts are lengthened (Text-fig. 16, *a*), articulate basally with the other pair, and form a pair of curved "parameres". Edwards only found these structures in one of his groups, but in fact they are to be found in all species of the subfamily, although with greater or lesser development.

I am recognizing two genera in the subfamily and no subgenera, because I consider that the differences used by Edwards and Goetghebuer for defining their groups and subgenera are really only specific differences. I have seen material of seven species which can be placed in the same two genera as the Palaearctic species. Kieffer described a genus *Kribiocladius*, from a female stating that it belonged to "Groupe *Corynoneura*", and I have with some doubt synonymized it with *Thienemanniella*. Tables I and II (p. 292) list the species previously described by Kieffer and Goetghebuer.

KEY TO AFRICAN GENERA OF CORYNONEURINAE

- Eyes pubescent; posterior tibiae not swollen and without apical projection; costa longer (Text-figs. 17, *b, c*) *Thienemanniella* Kieffer
 Eyes bare; posterior tibiae somewhat swollen at tip, obliquely truncate and with a conspicuous apical projection on inner side; costa shorter (Text-figs. 16, *b, c*)
Corynoneura Winnertz.

Genus *CORYNONEURA* Winnertz

Corynoneura Winnertz, 1846, *Stettin. Ent. Zeitg.* 7, 12; Kieffer, 1911, *Trans. Linn. Soc. Lond. (Zool.)* 14, 363; Goetghebuer, 1939, in Lindner, *Flieg. Pal. Reg.* 3 (13f), 4.

Corynoneura subg. *Corynoneura* Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 367.

Eucorynoneura Goetghebuer, 1939, *Ibid.* 3 (13f), 4.

Paracorynoneura Goetghebuer, 1939, *Ibid.* 3 (13f), 7.

Eyes bare; hind tibiae somewhat swollen at tip, obliquely truncate and with a conspicuous apical projection on inner side; costa extending not more than two-fifths of wing in male and ending far before posterior fork, in female to about middle of wing and not quite to fork.

As mentioned above, I am treating *Corynoneura* as a full genus. Edwards arranged the eight British species in three groups which Goetghebuer (1939) raised to subgeneric status. Although the groupings are useful, I do not think they warrant such a high status and I do not propose to employ Goetghebuer's names.

Kieffer and Goetghebuer have each described a single species of *Corynoneura* from Africa.

KEY TO AFRICAN SPECIES OF *Corynoneura*

1. Antenna with rosette of short hairs at apex 2
 Antenna without rosette at apex 3
2. Rosette hairs as long as terminal segment, no plume hairs on this segment in male
cristata Freeman
 Rosette hairs less than half length of terminal segment, which carries plume hairs basally in the male *dewulfi* Goetghebuer
3. Apical antennal segment of male approximately equal in length to two preceding together *seychellensis* Kieffer
 Apical antennal segment of male longer than the preceding four together
elongata Freeman

Corynoneura dewulfi Goetghebuer

Corynoneura dewulfi Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27, 364.

Corynoneura scotti Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 209 (SYN. NOV.).

Examination of Goetghebuer's type has shown that his figure of the male antenna is quite inaccurate: there is a rosette of hairs at the apex and plume hairs on the basal half of the last segment. *C. scotti* thus falls as a synonym. It is very similar to the Palaearctic species *C. celtica* Edwards, but the rosette hairs are longer and there are more plume hairs at the base of the last segment.

A minute dark insect, sometimes paler at the base of the abdomen in the male; female browner and with separate scutal stripes; last antennal segment with apical rosette hairs half length of segment; coxite with inner lobe, "parameres" long.

Male. Wing length 0.6-1.0 mm.

Head, mouthparts and antennae black or very dark brown; flagellum 10-segmented, last segment (Text-fig. 16, *d*) about as long as two preceding together, slightly clubbed, with some plume hairs basally and a rosette of hairs apically, rosette hairs not longer than half length of segment; eyes bare. *Thorax* entirely matt black or pleura may be pale, dorso-central bristles whitish. *Legs* yellow or brown, knees often darkened, L.R. 0.6, posterior basitarsus twice as long as second segment. *Wing* shape and venation as in Text-fig. 16, *b*; clavus very short, posterior fork also short. Halteres yellow or brown. *Abdomen* blackish, usually rather paler on four basal segments, occasionally whitish on these segments; hypopygium (Text-fig. 16, *a*) with struts as shown; "parameres" long and flattened at apex; IXth tergite simple, lacking anal point but with a few hairs; coxite with inner lobe near apex, styles simple.

Female. Head blackish, mouthparts yellow, antennae pale with last segment darker and bearing an apical rosette, all segments more or less equal. Thorax with yellowish background and three dark brown stripes, usually well separated, scutellum and postnotum blackish. Legs yellow, halteres yellow, wing venation as in Text-fig. 16, *c*. Abdomen may be yellowish basally, darker near apex, each segment translucent for apical quarter.

Holotype male of *dewulfi* in Musée Royal du Congo Belge; of *scotti* in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype and some paratypes of *scotti*, Kirstenbosch, iv. 1952; other paratypes Berg River, Wellington and French Hoek, v, vii, ix, x. 1952 (all coll. *K. M. F. Scott*). NATAL: 1 ♂, 1 ♀, Giant's Castle Camp, Bushman's River, ix. 1953 (*A. D. Harrison*). TRANSVAAL: 8 ♂, 1 ♀, Lydenburg Distr., Santa River and 5 ♂, nr. Johannesburg, iv. 1955 (*A. D. Harrison*). TANGANYIKA: 12 ♂, Kilimanjaro, iii. 1951 (*R. G. Tapley*). UGANDA: 1 ♂, 1 ♀, Ruwenzori Range, Kilembe, 4,500 ft., xii. 1934 (*F. W. Edwards*). BELGIAN CONGO: holotype and paratypes 2 ♂, Escarpement Kabasha, Chambi x. 1933 (*de Wulf*).

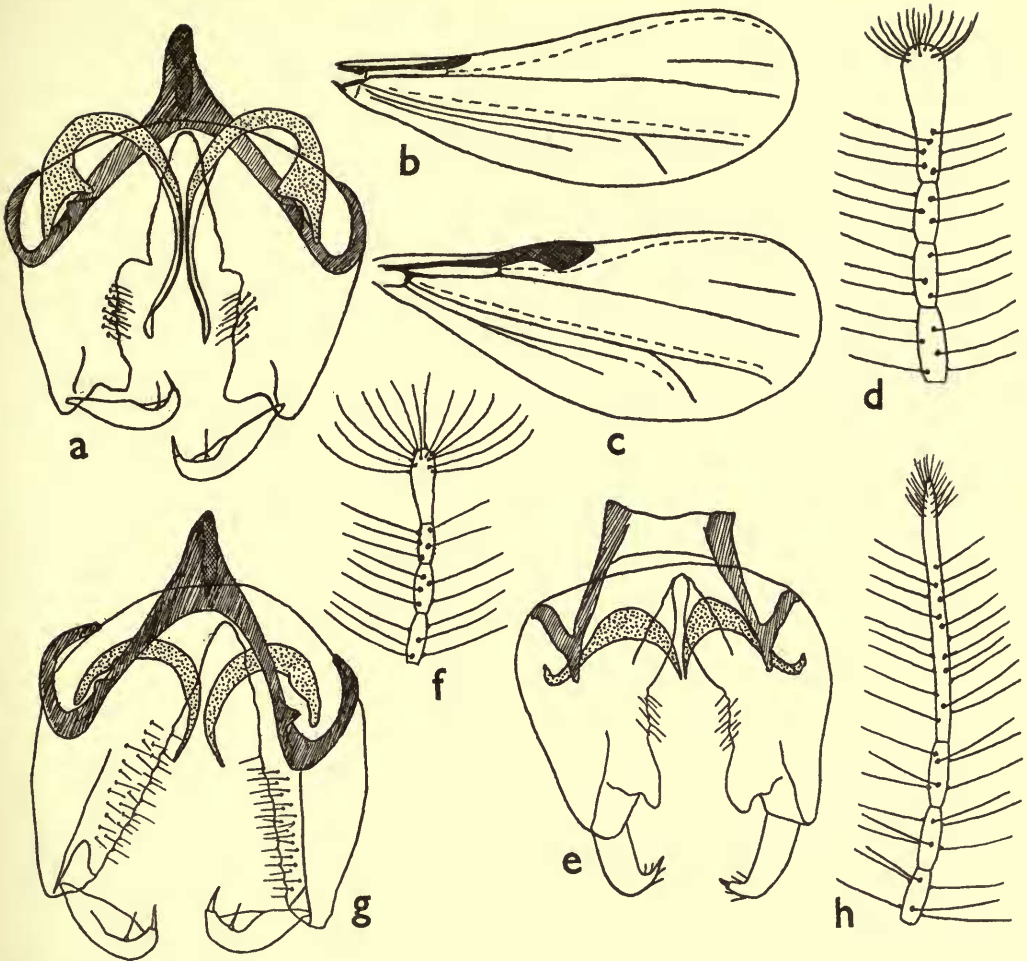


FIG. 16. *Corynoneura*. *C. dewulfi*: (a) male hypopygium; (b) male wing; (c) female wing; (d) apex of male antenna. *C. cristata*: (e) male hypopygium; (f) apex of male antenna. *C. elongata*: (g) male hypopygium; (h) apex of male antenna. Only bases of antennal plume hairs shown.

Corynoneura cristata Freeman

Corynoneura cristata Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 209.

Similar to *dewulfi* in size, colour, wing venation and proportions of legs, differing in structure of apex of antenna and in hypopygium.

Male. Antenna with 10-segmented flagellum; last segment slightly clubbed and about equal to preceding two together (Text-fig. 16, f), with no plume bristles but with an apical rosette of long hairs each being longer than the segment itself. Hypopygium (Text-fig. 16, e) differing from *dewulfi* in the structure of the struts, the median one being broader and the "parameres" short and flat; apex of style sharply bent.

Female not known.

Holotype male and 2 ♂ paratypes CAPE PROVINCE, French Hoek Forest Reserve, x. 1952 (*K. M. F. Scott*) in British Museum. There are no other records.

Corynoneura elongata Freeman

Corynoneura elongata Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 210.

Similar to *dewulfi* and *cristata*, but differing in antennal and hypopygial structure.

Male. Antenna (Text-fig. 16, *h*) with 10-segmented flagellum; apical segment rather longer than the four preceding together, narrow and not clubbed, with plume hairs for nearly three-quarters of its length, apex with short hairs not arranged in a rosette. Hypopygium (Text-fig. 16, *g*) with internal struts very similar to *dewulfi*, but "parameres" shorter; coxites with no inner lobes.

Female very similar to *dewulfi* but differs in the absence of apical antennal rosette, the hairs resembling those of male.

Holotype male in British Museum.

DISTRIBUTION. CAPE PROVINCE: holotype and 1 ♂ paratype Berg River, French Hoek Forest Reserve, x. 1952 (*K. M. F. Scott*). 4 male paratypes Zeekoe Vlei xi. 1952 (*K. M. F. Scott*). TRANSVAAL: 15 ♂, 8 ♀, Olifantsvlei, nr. Johannesburg, ii, iii, iv, vii, viii. 1954 (*A. D. Harrison*).

Corynoneura seychellensis Kieffer

Corynoneura seychellensis Kieffer, 1911, *Trans. Linn. Soc. Lond.* (Zool.) 14, 363.

There is a single male of the type series in the British Museum lacking the abdomen. In colour it differs from *dewulfi* by the dark brown instead of black thorax. In structure it resembles *dewulfi* except for the arrangement of the short hairs at the apex of the antenna, which do not form a rosette but which spread down the antenna for a distance equal to the width of the last segment. I have not been able to examine the hypopygium.

DISTRIBUTION. Known only from the type locality of SEYCHELLES: Mahé, Cascade Estate, 800–1,500 ft.

Genus *THIENEMANNIELLA* Kieffer

Thienemanniella Kieffer, 1911, *Bull. Soc. ent. France*, 187; Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27, 365–6 (in part); Goetghebuer, 1939, in Lindner, *Flieg. Pal. Reg.* 3 (13f), 1.

? *Kribiocladius* Kieffer, 1923, *Ann. Soc. ent. France* 92, 181.

Corynoneura subg. *Thienemanniella* Edwards, 1929, *Trans. ent. Soc. Lond.* 77, 366.

Eyes pubescent; posterior tibiae not swollen and without apical projection; costa in male extending to two-fifths of wing length and nearly to posterior fork, in female to beyond middle of wing and posterior fork.

I am treating this group as a full genus and not as a subgenus of *Corynoneura*.

Kieffer described *Kribiocladius* from a single female with pubescent eyes from French Cameroons. He stated in the key to genera that it belonged to "Groupe *Corynoneura*" and although his description is difficult to follow, it seems likely that

he was dealing with a species of *Thienemanniella*. I am unable to include the species in the key.

Goetghebuer has described two species in this genus, the type series of which I have examined in Musée Royal du Congo Belge. The first, *T. chambiensis*, does not belong to this genus at all but is a species of *Stempellina* (subf. Chironominae) thus accounting for the peculiar venation and the presence of macrotrichia on the wing. The type series of other species, *T. trivittata*, is a mixed series and is dealt with below.

KEY TO AFRICAN SPECIES OF *Thienemanniella*

1. Anal lobe of wing present though not produced (Text-figs. 17, *b, c*), basal abdominal segment with group of 4-6 bristles each side, last segment of male antenna as long as preceding three together *trivittata* Goetghebuer
- Anal lobe reduced (Text-fig. 17, *f*), only a single bristle each at base of abdomen 2
2. Last segment of male antenna equal to preceding five together; thorax of male black *antennata* Freeman
- Last segment of male antenna shorter than preceding two together; thorax of male with separate stripes *lineola* Freeman

Thienemanniella trivittata Goetghebuer

Thienemanniella trivittata Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27, 53.

Thienemanniella analis Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22, 212 (SYN. NOV.).

The type series of *T. trivittata* consists of three specimens, one male and two females, all of different species. One of the females is *Corynoneura dewulfi* and may have been mixed by Goetghebuer when he wrote the labels, the other two can probably be considered as the true type series and both belong to species since described by me: the female to *T. analis* and the male probably to *T. lineola*. Although Goetghebuer did not categorically state the sex of the type in his description, it is clear that he intended it to be the female which I now fix as lectotype. This means that *T. analis* becomes a synonym. The shape of the anal area in Goetghebuer's figure of the wing is quite inaccurate.

Male blackish, female more yellow and with separate stripes; last segment of male antenna as long as preceding three together; flagellum with 12 segments; wings with anal area well developed; first abdominal segment in both sexes with a group of 4-6 bristles each side.

Male. Wing length 1-1.2 mm.

Head, antennae and plumes blackish, mouthparts brown; flagellum with 12 segments, last segment (Text-fig. 17, *d*) slightly clubbed and as long as preceding three together, basal half of it with plume hairs, apex with short hairs; eyes with short pubescence. *Thorax* black, stripes fused. *Legs* brown, L.R. 0.75, fourth tarsal segment rather bilobed, last one flattened dorso-ventrally. *Wings* milky, venation (Text-fig. 17, *b*) with clavus not reaching level of posterior fork, anal area well developed but not produced. squama bare. Halteres with whitish knobs. *Abdomen* black, browner ventrally, with bristly hairs across bases of all segments, segment 1 with a group of 4-6 each side only, segments 2-7 with 9-11 in a row across, segment 8 with 1-2 only. Hypopygium (Text-fig. 17, *a*) with struts smaller than in *Corynoneura*, "parameres" strongly curved and bent over at tips.

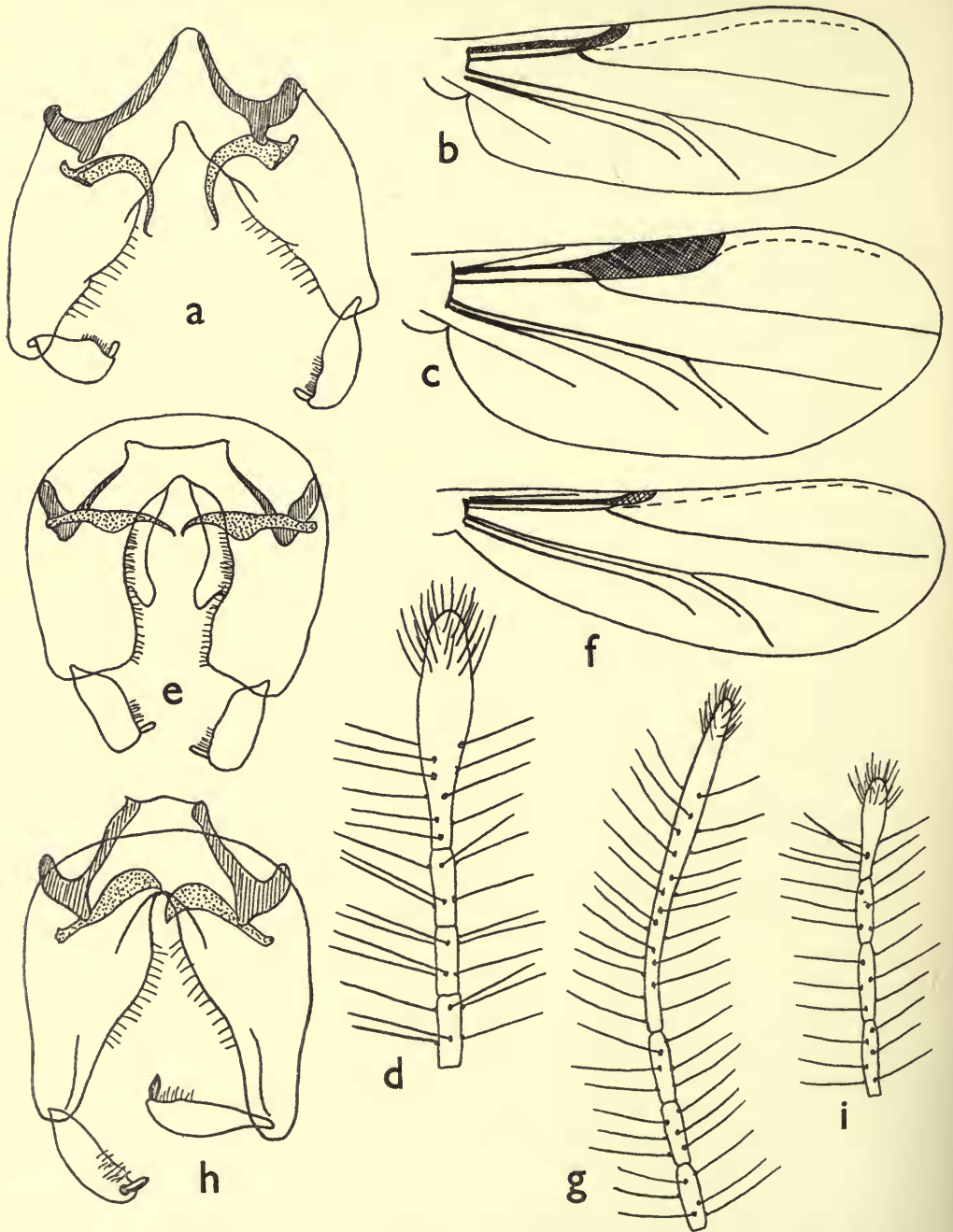


FIG. 17. *Thienemanniella*. *T. trivittata*: (a) male hypopygium; (b) male wing; (c) female wing; (d) apex of male antenna. *T. antennata*: (e) male hypopygium; (f) male wing; (g) apex of male antenna. *T. lineola*: (h) male hypopygium; (i) apex of male antenna. Only bases of antennal plume hairs shown.